ENERGY CONSERVATION AND SMALL BUSINESSES

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY, ENVIRONMENT, AND SAFETY ISSUES AFFECTING SMALL BUSINESS

OF THE

COMMITTEE ON SMALL BUSINESS HOUSE OF REPRESENTATIVES

NINETY-SEVENTH CONGRESS

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ENERGY CONSERVATION AND SMALL BUSINESSES

MONDAY, OCTOBER 19, 1981

HOUSE OF REPRESENTATIVES, SUBCOMMITTEE ON ENERGY, ENVIRONMENT, AND SAFETY ISSUES AFFECTING SMALL BUSINESS, COMMITTEE ON SMALL BUSINESS,

Salem, Mass.

The subcommittee met, pursuant to notice, at 9 a.m., in the library conference room, Salem State College, Salem, Mass., Hon. Berkley Bedell (chairman of the subcommittee) presiding.

OPENING STATEMENT OF CHAIRMAN BEDELL

Mr. BEDELL. The Subcommittee on Energy, Environment, and Safety Issues Affecting Small Business of the Small Business Committee of the U.S. House of Representatives will come to order.

This morning we are conducting a field hearing to examine the subject of small business and energy conservation. This is a matter of obvious interest to the Energy Subcommittee of the House Small Business Committee.

Before we get started, I want to acknowledge the role Congressman Nick Mavroules has played in arranging this hearing.

Nick is the senior Democrat on the Energy Subcommittee, and it is at his suggestion and invitation that we are conducting this hearing in Salem. Nick and his staff have provided invaluable assistance in making the arrangements needed to make this hearing as productive as possible.

It seems to me to be especially appropriate to be holding this hearing here in New England, just as the cold weather is setting in. Perhaps more than any other part of the country, New England should be aware of our Nation's dependence on vulnerable foreign sources of energy. With the Yankee tradition of frugality, I am sure that local small businessmen are quite sensitive to the economic impact of high energy costs.

With this in mind, we have asked today's witnesses to address three questions of special interest to the subcommittee. Each witness may choose to address one, two, or all three of the questions.

The questions are: What are the characteristics of small business energy usage, what can the individual small business do to reduce its energy consumption, and what are small businesses doing in the way of developing and marketing energy conservation and alternative energy technologies.

In addition, the subcommittee has an ongoing interest in the effectiveness of various Federal programs and policies designed to

foster energy conservation and the development of alternative energy sources.

If a witness has any strong feelings concerning energy tax credits, SBA energy loans, energy information programs, or any other relevant Federal activity, we would be interested in hearing your comments.

I must say that the subcommittee has been overwhelmed by the small business community's interest in this hearing. In fact, we are considering holding additional hearings on this subject in order to accommodate everyone who wishes to be heard.

Today we have a very full and diverse witness list. We have encouraged our witnesses to submit their prepared statements for the record, and to summarize their remarks as much as possible. All witnesses are asked to keep their presentations to 10 minutes or less, so that we will have time for questioning and dialog.

We will try to complete these hearings by noon. Therefore, the chairman is going to have to push things along fairly rapidly, so that people who appear later on will have an opportunity to be heard.

I would like now to call on Congressman Mavroules, with whom it has been a great pleasure for me to serve in the U.S. Congress.

OPENING STATEMENT OF HON. NICHOLAS MAVROULES, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MASSACHUSETTS

Mr. MAVROULES. Thank you very much, Mr. Chairman.

Let me once again thank you for taking time out of your very busy schedule to come to my district and have this unique hearing, because it is most unusual to have hearings on the congressional level in Massachusetts. I appreciate it very much.

Let me also give a thanks to President Amsler and the staff of Salem State for allowing us the use of this little conference room. Many thanks to the staff members who are with us this morning—Mr. Rosenberg, Mr. Kulikowski, and also Sandy Johnson from my staff. I want to thank you for the preparation of the hearing this morning.

I would like to welcome you to Salem this morning and am pleased to be able to host this hearing on a subject that is of great concern to us in the House Small Business Committee, the issue of small business energy usage.

The main focus of our hearing will be on the use of energy conservation and alternative energy technologies to help reduce energy costs.

I am very fortunate to have this hearing held in my district, for it provides an ideal site for discussing an issue that has serious implications for the New England business community.

I need not stress the fact that most small businesses are struggling to keep their heads above water today, thanks not only to high interest rates and a persistently high rate of inflation, but also to rising energy costs.

Of course, it comes as no surprise to us that these problems are exacerbated in New England, owing to its unique energy problems. New England has roughly 26 percent higher energy costs than the

rest of the Nation. These higher energy costs are primarily due to the fact that over 80 percent of its energy sources is oil, as compared to 47 percent for the national average.

A GAO study released on June 11, 1981, reveals how serious a problem these energy costs are for the economic future of the region. I would like to have the GAO study on New England oil dependence included in the record, for it presents an informative analysis as to what steps it believes should be implemented and why such steps have not been taken to date.

New England business people feel the pinch from constantly escalating energy prices that cut deeply into their profit margin and inflate their operating expenses. Unfortunately, New England's energy mix has placed New England small businesses at a disadvantage in fostering competition with other parts of the country for industrial development and economic growth.

In addition, the New England business person must contend with expensive utility rates. Electrical generation is of fundamental importance to the economic fortunes of any region, and New England is no exception to this.

New England pays about 45 percent more for a delivered kilowatt hour of electrical energy than the Nation as a whole. Certainly this problem cannot be avoided in any discussion of small business energy usage and conservation.

Today we have quite an important task awaiting us, for we must address the serious energy problems plaguing New England small businesses. We will be exploring small business energy usage, utility rate differentials affecting small businesses, energy conservation methods that are beneficial to small businesses, and how tax credits can be used by small businesses to reduce energy costs.

This last subject area is of particular concern for us today, for rumors have been abounding in Washington that the current tax credits for energy conservation measures face elimination if President Reagan has his way.

The Reagan administration's rationale for this action is to provide additional revenues for the Treasury and to eliminate these incentives because they are obsolete. Needless to say, many Members of Congress feel otherwise.

I myself have recently cosponsored two legislative initiatives that promote the concept of energy conservation tax credits. I look forward to hearing from today's witnesses as to the extent of their usage from a small business perspective.

Today's hearing will offer us the chance to explore each of these important areas and our panel of witnesses are sure to offer us an enlightening analysis of these issues. We hope that these hearings will provide small businesses in New England the forum needed to make Congress aware of what they have done right in the area of energy costs reduction and what they need to do in the future to stimulate even more activity in this area.

Mr. Chairman, if I could at this point in the record read for the record a letter that we just received, and I would like to make it part of the record this morning.[1] It is from the New England Fuel Institute. It is addressed to me.

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[1] See app. A.

DEAR CONGRESSMAN MAVROULES:

1,264 heating oil distributing members request that you do everything possible to oppose the Administration's plan to eliminate consumer and industrial tax credits for solar and conservation measures. Such a move would be short-sighted and not in the long-range energy interests of New England.

There are about 12,000 solar heating installations throughout the region, the majority of which are adjunct systems to existing oil heating systems. Ten percent of these installations have been made by NEFI member heating oil distributors. This is a distinct contribution to New England's energy economy that must be continued.

We request your prompt support of the House resolution endorsing the continuance of solar conservation tax credits.

Sincerely, Charles H. Burkhardt, President.

Thank you very much, Mr. Chairman.

Mr. BEDELL. Thank you, Congressman Mavroules.

Our first witnesses are Dan Tearno and Denny Dennis, National Federation of Independent Business, from Boston, Mass., and Washington, D.C., respectively.

TESTIMONY OF WILLIAM J. DENNIS, JR., DIRECTOR OF RESEARCH, ACCOMPANIED BY DAN TEARNO, MASSACHUSETTS REPRESENTATIVE, NATIONAL FEDERATION OF INDEPENDENT BUSINESS

Mr. DENNIS. I am Denny Dennis, and accompanying me is Dan Tearno.

Thank you very much, Mr. Chairman, for allowing us to be here and present our views today. I will present the bulk of the testimony, and then I am certain that Mr. Tearno, who is a longtime Massachusetts resident, and a former aide to now Senator Tsongas, will be able to supplement anything that I have to say.

We would like to focus our remarks on electricity, what we believe to be discriminatory electric rates, and particularly how the situation affects the State of Massachusetts.

There are essentially two means of reducing small business energy costs. The first one is conservation, direct out and out conservation. Since many witnesses will be discussing the specifics of energy conservation, we would like to direct our attention to the second method by which small business can reduce costs. That involves fair prices for energy; in other words, an energy pricing structure where one segment of society does not subsidize another segment.

In effect, what we are seeing in one segment of energy costs—namely, commercial electric rates—is cross-subsidization through the pricing mechanism.

If I could, I would like to digress and explain how commercial electric rates are established.

The fundamental principle behind electric utility ratemaking is cost of service; that is, the price or the charge to the consumer is whatever it costs utilities to provide that electricity, plus some reasonable rate of return.

To simplify ratemaking somewhat, we divide all consumers into three fundamental classes.

There is the residential consumer—homes. There is the commercial consumer, which includes small businesses and some relatively large firms as well. It might include various office buildings, Sears Roebuck, people of that nature.

Then, finally, there is the industrial class. The industrial consumer tends to be a very, very large consumer and is, as the term implies, industrial. Generally the distinction is whether or not the consumer has certain equipment on the premise, notably transformers.

Now, if we look at electric rates, we see that as a whole, or as a group, commercial rates are the absolute highest rates we have. Residential rates are next. That would be just following page 7, Congressman.

Mr. BEDELL. Thank you.

Mr. DENNIS. Commercial rates are the highest rates we have. They are followed very closely by residential rates, and then industrial rates are at about 50 percent.

If we look more closely at the table, we will see that since mid-1976 the commercial rate is the highest, and the difference is growing. Perhaps the chart doesn't quite show the difference to an adequate degree, but indeed the difference is growing.

We cannot look at these absolute rates and say the difference in rates represents the amount of discrimination because we have this cost-of-service principle involved. Some types of users are more expensive to provide electricity to than others.

As a general rule, it is well known, both in the utility industry as well as in other segments of society, that electric rate discrimination against the commercial class exists.

Now, there are two fundamental reasons why this doesn't really pertain directly to small business. The first one is because there are larger firms in that class; second, because within the commercial class, there are certain types of volume discounts.

So NFIB commissioned a study in which we attempted to hold the cost of service constant. In other words, what we wanted to do was look at electric utility rates by classes of user when we knew the cost of service was virtually identical to each type of user considered.

For a number of reasons, unfortunately, we could not include industrial, but we were able to compare small commercial, in other words, a small business, small commercial, against residential.

We found on a national basis, an unweighted national average, that small commercial users are paying 46 percent more for their electricity than are residential consumers.

This varies enormously from utility to utility. I would like to draw your attention to the tables following page 9. They are tables Nos. 4 and 5.

On table No. 4 we have the 10 highest small commercial electric rates by utility as of January 1, 1980. On the table we have three measures. We will be discussing these three measures in some detail.

The first measure is the absolute small commercial rate per kilowatt-hour. That is exactly what the firm is being charged. The second column is the percentage difference in rates between small commercial and residential consumers; in other words, the division of the small commercial rate by the residential rate. The third is the absolute difference in rates between the small commercial and the residential consumers; in other words, you subtract one from the other.

If you will look at the absolute rates, we go from a high of 13.5 cents per kilowatt-hour produced by Con Ed of New York City and a low of 1.9 cents per kilowatt-hour for the city of Seattle.

Similarly, we notice that there is an enormous percentage differential in the rates—128 percent in the city of Provo, Utah. In other words, if a residential consumer paid $1 for electricity in Provo, the commercial user would be paying $2.28 for that same amount of electricity. That is at one extreme.

The other extreme is the city of Los Angeles, Calif., where a small business would pay 95 cents and the residential consumer would pay $1. That is the only negative one, by the way, in the country.

In the third column we see the absolute difference. This brings us to the State of Massachusetts, because if you look, you will see that the two highest in the Nation belong to Western Massachusetts Electric, at 6.4 cents, and Boston Edison at 5.2 cents.

This 6.4 cents difference charged by Western Massachusetts Electric is higher than the absolute cost of 100 utilities of the 240 we studied, and the 5.2 cents of Boston Ed is higher than 50 utilities of the 240 throughout the country.

If you look more closely on table 6, you will begin to see how the Massachusetts utilities stack up against one another. We have included eight.

The first point to recognize in column one is that Massachusetts has a high electric utility rate structure. Basically it involves a number of the points that Congressman Mavroules has already pointed out. But there is also something else; that is, a relatively large differential from utility to utility.

That is just following page 10, table 6.

We find that the absolute rate charged by Western Massachusetts Electric is 11.8 cents. That is the high. The rate charged the city of Holyoke is 7.9 cents. That is almost a 50-percent differential.

Further, if we go to the second column, where we are talking about percentage differential—by the way, if I may revert back to the prior column. All rates, all absolute costs in Massachusetts, are in the top 25 percent of the utilities studied.

If we go to the second column, we will see that the percentage differential is very high among some utilities, and relatively low among others. For example, four of these Massachusetts utilities, four of the eight studied, have a below average percentage differential.

If we look at Brockton Edison, Fall River Electric Light, city of Holyoke, and Massachusetts Electric Co., all fall below the national average.

However, there is something to consider when we are talking about differential, percentage differential; that is, it doesn't make any difference whether you are a high cost State or a low cost State.

For example, the city of Palo Alto, Calif., which is a very low cost utility, has a very high percentage differential; in other words, in percentage terms their discrimination is quite high. In absolute terms their discrimination is relatively low.

The third column is the most critical one because that provides the absolute amount by which small businesses are apparently

overcharged. Here again we see Western Massachusetts Electric is No. 1, Boston Edison is No. 2, but all eight Massachusetts utilities studied rank in the top half nationally. The lowest is again the city of Holyoke.

Now, I think there are other measures as well pertaining to the State of Massachusetts that we can use and bring out.

The table on page 12 will give us one final look at the State of Massachusetts. Then I will conclude.

This comes from the Wilson study, which was conducted for the Small Business Administration in 1980. What it does is looks at the rate of return on each class of user. What we find is that in the case of New Bedford Gas and Electric, commercial users provide a 49-percent greater rate of return than industrial users and 177-percent greater return than residential users.

So, it seems to us clear that not only throughout the country, but particularly in the State of Massachusetts, that the small commercial users are subject to substantial rate discrimination.

The question of course becomes why. I think if we are honest about the situation, we have to say it is small business' fault. Public hearings at which rates are set are open. We simply have to attend, and we have to present our case.

I wish we could blame somebody, but in this case, we cannot.

I further think that as time goes on, and small businesses do begin to participate actively in ratemaking, we will find that small business will not necessarily ask for their rates to be rolled back, but that they will ask that their rates become frozen until such time as they achieve parity with other users.

That is a summary of my statement.

[Mr. Dennis' prepared statement follows:]

PREPARED STATEMENT OF WILLIAM J. DENNIS, JR., DIRECTOR OF RESEARCH, NATIONAL FEDERATION OF INDEPENDENT BUSINESS

Mr. Chairman, NFIB, in excess of 500,000 small and independent member firms including more than 10,000 in the State of Massachusetts, appreciates this opportunity to discuss small business energy consumption and costs. In particular, we would like to focus our remarks on electricity, what we believe to be discriminatory electric rates, and the impact of those rates in Massachusetts.

Before proceeding I would like to introduce Dan Tearno, NFIB's Government Relations Director for Massachusetts. Mr. Tearno is a former aide to then Congressman Tsongas and is one of the most capable people the Federation employs. The NFIB/Massachusetts office where Mr. Tearno is located can be found at 31 Milk St., Boston.

SMALL BUSINESS ENERGY CONSUMPTION

Small business is a major energy user in the United States. While the amounts of energy consumed by small business have never been precisely quantified, NFIB has estimated (1977) that small business uses monthly approximately 35,000 million kilowatt hours of electricity, over 400 MCF of natural gas, 1,000 million gallons of fuel oil and kerosene, and staggering amounts of vehicle fuels.[1] Electricity is the energy source common to nearly all small businesses. Natural gas and propane are used by over 50 percent, fuel oil and kerosene by approximately one-quarter, coal and coke by 1 percent, and vehicle fuels by three of every four small firms.

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[1] "5th Energy Report for Small Business," National Federation of Independent Business, San Mateo, Calif., June 1977.

IMPACT OF THE FIRM

Increased energy costs come right off the bottom line. They create no new wealth, no new employment, and no new production. While ultimately such increases may be the only means of bringing long term supply and demand into balance, there can be no doubt that increased energy costs have directly injured many small businesses and altered the competitive structure of others. It was estimated that the average cost of energy per small firm amounted to over $1,000 per month (1977).[2] Bivin and Dunkelberg calculated that these costs amounted to 3 percent of sales with smaller firms facing a higher percentage than larger small firms (1975 data).[3] The Energy Policy Institute, using 1978, 1979 and 1980 energy costs and employing operating costs rather than sales as a measure, found the same basic relationship.[4] In the Boston SMSA, it found that over one in four small firms examined incurred energy costs amounting to more than 10 percent of total operating expenses and another 24 percent incurred energy costs ranging from 6 percent—10 percent of operating expenses (see Table 1). (EPI also noted that energy costs as a percentage of operating costs increased each year.)

TABLE 1.—FUEL COSTS AS A PROPORTION OF TOTAL OPERATING COSTS (1978–80); b. BOSTON SMSA

Percent of costs	Percent of firms		
	1978	1979	Est. 1980
1–5	53	50	47
6–10	23	20	24
11–15	9	10	9
16–20	6	8	7
21–25	4	4	6
26–30	1	2	1
31–35	1	3	2
36–40	1	1	1
41 or more	2	2	3
Total	100	100	100
N equals	346	372	327

Source: Energy Policy Institute.

To provide a clearer picture of what these figures mean to the individual operating a small business, let us examine the income statements and balance sheets of three modeled small business types as prepared by IMR.[5] One of those was retail grocers with sales of $900,000; the second was laundry and dry cleaning firms with sales of just over $250,000; the third was specialty trade contractors with sales of almost $500,000. Each firm type was provided two income statements and balance sheets. The first, "Unaltered Model Values" reflects what is actually happening, while the second, "Less Excess Electricity" reflects how the balance sheet would have looked if "excess electric rates" were not charged (see table 2). The comparison is hardly perfect for present purposes because it does not measure total energy cost increases. Instead it measures alleged electric overcharges, a point we will return to shortly. However, the comparison clearly demonstrates the manner in which energy costs, hence increased costs, affect the bottom line.

For simplicity look at the line "Net Profit" (Before Taxes). The grocers in the unaltered model found their net profit to be $6,300, only seven-tenths of 1 percent sales—not much of a return. With reduced electronic costs, however, the bottom line was $18,740—still not a great return, but enormously superior to the unaltered cost

[2] Ibid.

[3] Bivin, David and Dunkelberg, William C., "The Effects of the Shortage of Energy on Small Business in Region V", The Regional Environmental For Small Businesses and Entrepreneurship: Region V, (eds.) Cooper, Arnold C., and Dunkelberg, William C., unpublished, Fall, 1979.

[4] "Impact of Increasing Energy Prices and Energy Supply Curtailments on Small Business in the U.S.," a report to the Small Business Administration and the Department of Energy, Energy Policy Institute and Graduate School of Business, University of Pittsburgh, Pittsburgh, Pa., September 1981.

[5] "The Impact of Electric Rates on Small Business," report to the Department of Energy, IMR Corporation, Falls Church, Va., July, 1981.

model. The laundry and dry cleaning model provided a lesser difference because of the amount of electricity used. The figures were $11,340 and $12,917. Finally, the specialty trade contractors registered $19,071 and $20,371.

The important point is that these figures represent just one year. Compounding them over a period of years makes a significant difference in terms of every financial measure on an income statement and balance sheet.

TABLE 2.—THE EFFECT OF REDUCED ELECTRICITY COSTS ON MODEL RETAIL FOOD STORES

	Unaltered model values	Less excess electricity
Net sales	$900,000	$900,000
Cost of operations	723,600	711,160
Gross profit margin	176,400	188,840
G. & A. expense	170,100	170,100
Net profit (before taxes)	6,300	18,740
Cash	17,280	17,280
Accounts receivable	7,222	7,222
Inventory	33,346	33,346
Current assets	76,682	89,122
Fixed assets	53,280	53,280
Total assets	144,000	156,440
Current liabilities	47,928	47,928
Total liabilities	84,000	84,000
Net worth	60,000	72,440
Current ratio	1.60	1.86
Quick ratio	.90	1.16
Sales to working capital	31.30	21.85
Debt to net worth	1.40	1.16
Debt to total assets	.58	.54
Inventory turnover	21.70	21.33
Average collection period	2.90	2.90
Fixed asset turnover	16.89	16.89
Profit margin on sales	.70	2.08
Return on assets	4.37	11.98
Return on net worth	10.50	25.87

Source: IMR.

While there is an obvious effect on the bottom line, does small business recognize it? Unquestionably. Last January NFIB asked a sample of our urban members to rank the severity of 25 common small business problems.[6] The increasing cost of energy, utility bills, etc., one of the problems listed, was ranked No. 3. That problem was judged by operating small businesses to be more severe than such other commonly perceived small business problems as "Obtaining Loans," "Cost of Labor," etc.

The immediate question raised, therefore, is "What can be done to reduce small business costs or at least ameliorate future increases?" Obviously, conservation (more appropriate terminology from the small business perspective is "energy cost reduction") is one important method. While often constrained in situations of weak cash flow or where the business owner pays the utilities but does not own the building, it is clear that many small firms have altered their operation and/or knowingly or unknowingly have made conservation investments. It should be clear, however, that such activities have not been undertaken for altruistic reasons or fear of future shortages; they are directly related to absolute energy cost increases.[7]

But there is a second method of reducing energy cost increases as well. That involves "fair" prices for energy and not a pricing structure that subsidizes some energy consumers at the expense of others. This second method of energy cost reduction brings us right to electric rates.

[6] Dandridge, Thomas C. and Dennis, William J., Fr., "Small Business in America's Cities: A Preliminary Report," National Federation of Independent Business, San Mateo, CA., October 1981.

[7] "5th Energy Report for Small Business," op. cit.

COMMERCIAL ELECTRIC RATES

The fundamental principle of electric utility rate making is cost-of-service. In other words, each customer should pay what it costs to provide electricity to that customer, including a reasonable return on invested capital. While the cost-of-service principle sounds reasonable and fair to most of us, it is more difficult to calculate in practice than in theory. Further, new rate making theories based on social and energy conservation grounds have been brought forward. It is little wonder that scores of well paid lawyers and economists are brought into rate making proceedings to argue the technicalities of fairly allocating costs among different consumer groups.

To simplify rate making somewhat, rates are established for user classes. The three principal classes are: residential, commercial and industrial. Overwhelmingly, small business falls into the commercial class. There are larger occupants of this class as well, including many very large commercial and industrial plants. However, it is the class which best represents small firms.

The Small Business Administration (SBA) recently contracted for a rate of return study (known as the Wilson Study).[8] While there are important limitations to the study, it did obtain information on 98 utilities in 43 States plus the District of Columbia. The results are summarized on table 3.

TABLE 3.—RELATIVE RATE OF RETURN BY USER CLASS

User class	Rate of return among user classes [1]		
	Highest	Middle	Lowest
Commercial	75	17	2
Residential	4	16	74
Industrial	15	61	18

[1] Three utilities had rates of return within 0.5 percent of one another over the three classes and were excluded. A fourth had identical rates of return for two user classes and was also excluded.

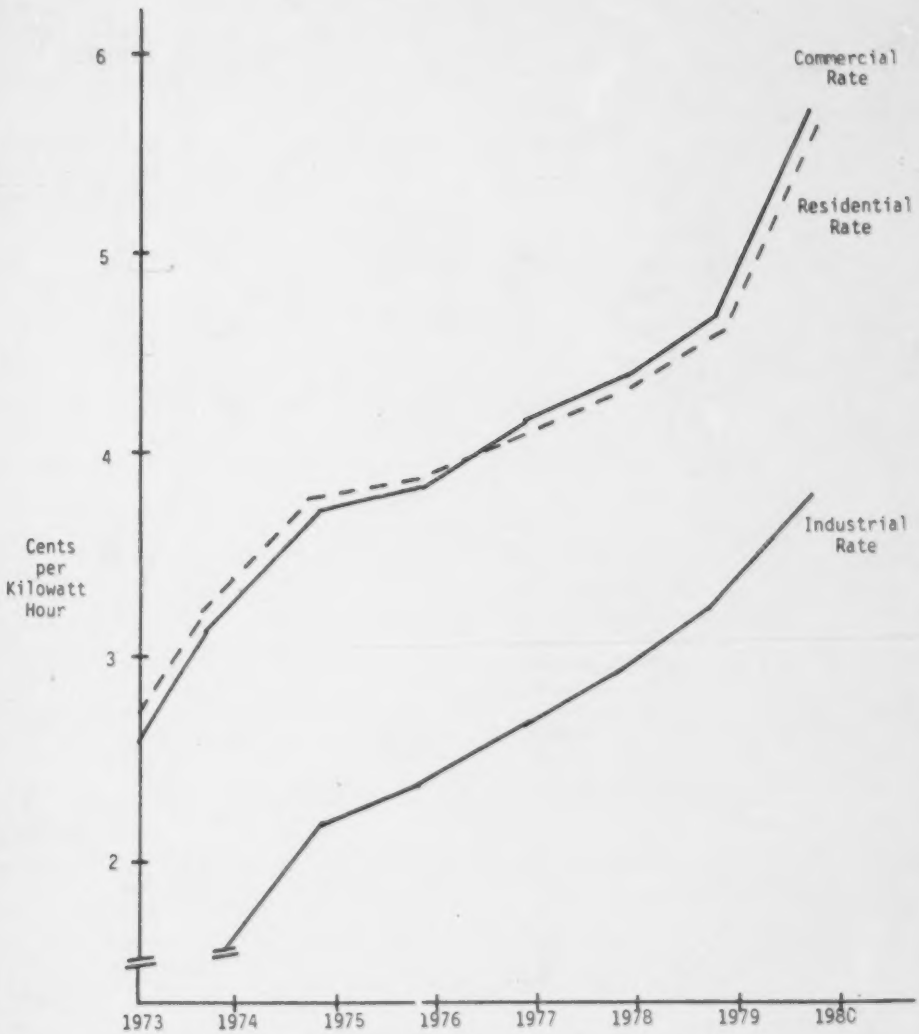
Source: Developed from the Wilson study.

At first blush these straightforward cost figures would lead us to conclude that industrial users are "getting away with murder". Commercial and residential consumers, though particularly commercial consumers, are subsidizing them. However, it must be recalled that rates are primarily established on the cost of service principle and it may be cheaper to serve some customers than others. A more sophisticated analysis is necessary. One such type of analysis is a rate of return study where costs incurred by a particular class are subtracted from revenues generated by that class, with the resulting figure divided by revenues. A higher rate of return on a particular user class indicates excess charges to that class and vice versa. A perfect rate structure would involve identical rates of return on each of the three classes.

Commercial rates have been the highest of any major user class since 1976. In that year they edged above residential rates and the gap has been slowly growing. Industrial rates have been lowest of the three classes, averaging about 50 percent of the other two on a kilowatt-hour basis (see chart 1).

[8] *"Comparative Cost Rates of Return in the Electric Utility Industry: A Comparative Study of Electric Rates Charged to Small Business Consumers,"* a report to the Small Business Administration, J. W. Wilson and Associates, Washington, D.C., March 1980.

CHART 1



TRENDS IN ELECTRIC UTILITY RATES
1973-1980

Source: Cabot Consulting Group

These data indicate that the commercial use is bearing excess charges with considerably greater frequency than not. In 75 of the 94 utilities on the table, the highest rate of return was received on the commercial class. But what the table doesn't show is how extreme many of the differentials were. For example, Otter Tail in North Dakota had almost identical rates of return on the residential and industrial classes, but the rate of return on the commercial was twice as great. The table also shows that residential users clearly are getting the best deal. And although the industrial user has the lowest absolute rates, the rate of return on the class has the greatest relative variance.

Electric rate discrimination against the commercial class is generally well known. However, two factors intervene to make commercial class discrimination not totally representative of possible small business discrimination. The first factor, as already noted, is that many large commercial and industrial firms also fall within the commercial class. The second factor is that there are volume discounts within the class. For example, the commercial firm using 6,000 kwh (January 1980 data) paid close to 6.42 cents per kwh, but the 10,000 kwh user paid 5.89 cents per unit. Contrast these per unit costs to the 5.48 cents average per unit cost for the entire commercial sector.[9] NFIB, therefore, wanted a study that would reflect discrimination (if any existed) against small commercial users, not just commercial users.

The resulting study, known as the Cabot study, directs itself precisely to that point.[10] To avoid the inherent problems in measuring cost-of-service, the study compared electric rates charged commercial and residential customers of the exact size, i.e. size in terms of electricity consumption. Cabot assumed, and justifiably so, minimal if any cost-of-service differences among those two types of consumer.

The study concluded that among the 240 utilities analyzed, the average (an unweighted average) small commercial user paid 46% more per unit of electricity than did the average (an unweighted average) residential user of identical size. Moreover, that average concealed an enormous variation from utility to utility. In Provo, Utah, the small commercial consumer paid $2.28 for the same amount of electricity for which the residential consumer paid $1.00, while in Los Angeles (the only place where the small commercial rate was lower than the residential rate) the small commercial consumer cost was 95 cents to the residential consumer cost of $1.00 (see Table 4 and 5). In other words, while we already know commercial users have been subsidizing other users, the Cabot study demonstrated that small commercial users as a subclass appear to be providing a subsidy to other users as well.

TABLE 4.—10 HIGHEST SMALL COMMERCIAL ELECTRIC RATES BY UTILITY—JAN. 1, 1980

National rank	Absolute small commercial rates (kilowatt-hours)	Difference in rates between small commercial and residential consumers	
		Percent	Absolute (Kilowatt-hours)
1	13.5 cents—Consolidated Edison of New York (N.Y.).	128—City of Provo (Utah)	6.4 cents—Western Massachusetts Electric Co. (Mass.).
2	11.8 cents—Western Massachusetts Electric Co. (Mass.).	119—Western Massachusetts Electric Co. (Mass.).	5.2 cents—Boston Edison Co. (Mass.).
3	11.7 cents—Delmarva Power & Light Co. (Del.).	111—Potomac Electric Power Co. (D.C.).	5.1 cents—Hartford Electric & Light Co. (Conn.). 5.1 cents—Philadelphia Electric Co. (Pa.). 5.1 cents—Utah Power & Light Co. (Utah).
4	11.4 cents—Philadelphia Electric Co. (Pa.).	109—Utah Power & Light Co. (Utah).	
5	11.3 cents—Boston Edison Co. (Mass.).	105—City of Palo Alto (Calif.)	
6	10.9 cents—Hawaiian Electric Co., Inc. (Hawaii).	103—New Orleans Public Services, Inc. (La.).	5.0 cents—Delmarva Power & Light Co. (Del.).
7	10.7 cents—Savannah Electric & Power Co. (Ga.).	100—City of Idaho Falls (Idaho)	4.5 cents—Savannah Electric & Power Co. (Ga.).
		100—City of Sioux Falls (S. Dak.)	4.5 cents—Duquesne Light Co. (Pa.).

[9] "The Impact of Electric Rates on Small Business, op. cit.

[10] "Small Business Electric Utility Rates," a report to the National Federation of Independent Business, Cabot Consulting Group, Washington, D.C., August 1981.

TABLE 4.—10 HIGHEST SMALL COMMERCIAL ELECTRIC RATES BY UTILITY—JAN. 1, 1980—Continued

National rank	Absolute small commercial rates (kilowatt-hours)	Difference in rates between small commercial and residential consumers	
		Percent	Absolute (Kilowatt-hours)
8	10.6 cents—City of Fairbanks (Alaska). 10.6 cents—Hartford Electric & Light Co. (Conn.). 10.6 cents—Public Service Electric & Gas Co. (N.J.).		
9		95—Union Electric Co. (Ill.)	4.2 cents—Union Electric Co. (Ill.).
10		95—Union Electric Co. (Mo.)	4.2 cents—Public Service Electric & Gas Co. (N.J.).

TABLE 5.—10 LOWEST SMALL COMMERCIAL ELECTRIC RATES BY UTILITY—JAN. 1, 1980

National rank	Absolute small commercial rates (kilowatthours)	Difference in rates between small commercial and residential consumers	
		Percent	Absolute (Kilowatt-hours)
1	1.9 cents—City of Seattle (Wash.)	—5—City of Los Angeles (Calif.)	—0.3 cents—City of Los Angeles (Calif.).
2	2.2 cents—Snohomish County PUD 1 (Wash.).	0—City of Ketchikan (Alaska) 0—City of Springfield (Mo.)	0 cents—City of Ketchikan (Alaska). 0 cents—City of Springfield (Mo.).
3	2.5 cents—City of Sacramento (Calif.).		
4	2.7 cents—Washington Water Power Co.	2—City of Lincoln (Nebr.)	0.1 cents—City of Lincoln (Nebr.).
5	2.8 cents—City of Tacoma (Wash.)	4—South Carolina Electric & Gas Co. (S.C.).	0.2 cents—South Carolina Electric & Gas Co. (S.C.).
6	3.2 cents—City of Eugene (Oreg.)	6—Interstate Power Co. (Iowa) 6—Cleveland Electric Illuminating Co. (Ohio). 6—Northern States Power Co. (Minn.).	0.3 cents—Interstate Power Co. (Iowa). 0.3 cents—Northern States Power Co. (Minn.).
7	3.4 cents—Pacific Power & Light Co. (Oreg.). 3.4 cents—City of Idaho Falls (Idaho). 3.4 cents—Puget Sound Power & Light Co. (Wash.).		
8			0.4 cents—Snohomish County PUD 1 (Wash.). 0.4 cents—Cleveland Electric Illuminating Co. (Ohio). 0.4 cents—Nevada Power Co. (Nev.). 0.4 cents—City of Colorado Springs (Colo.).
9		9—Nevada Power Co. (Nev.).	
10	3.9 cents—City of Palo Alto (Calif.).	10—City of Jacksonville (Fla.).	

SMALL COMMERCIAL ELECTRICITY COSTS IN MASSACHUSETTS

Electric costs in Massachusetts are comparatively high for all user classes. That is the result of a number of factors not germane to the current discussion. However, in two critical measures of comparative small commercial electric rates, small businesses appear to do less well here than anywhere else in the country. In particular, those small firms serviced by Western Massachusetts Electric Co. and Boston Edison Co. seem to be subject to substantial rate discrimination. However, each of the eight

Massachusetts utilities assessed appear to provide small commercial users a "bad deal". This situation is obviously one of deep concern to NFIB and other small businesses throughout the State.

Table 6 lists eight Massachusetts utilities with their charges to small commercial users as well as two comparative cost measures. The point to note on the table is that electricity costs are high in Massachusetts. The city of Holyoke, which charges the least to small commercial users, 7.9 cents kwh, still ranks in the nation's highest 25 percent. However, what is striking is the large difference in prices among Massachusetts utilities. Western Massachusetts Electric, for example, charges almost 50 percent more than does Holyoke; Boston Edison charges almost 40 percent more than Massachusetts Electric. The study was not intended to establish the cause of such differences, although they would be of undoubted interest to small commercial customers.

The second point to note on Table 6 is that just because Massachusetts is a high rate State, there is no inherent reason why small commercial users are charged substantially higher proportionate rates than residential consumers. Four Massachusetts utilities, Brockton Edison, Fall River Electric Light, City of Holyoke, and Massachusetts Electric nationally rank in the bottom half on percentage differential. In contract, some relatively low rate utilities, e.g. City of Palo Alto, Ca., and City of Idaho Falls, Id., have very high percentage differentials (see Tables 4 and 5). Therefore, the large percentage differences found in many utilities across the country including Massachusetts cannot be justified or argued on a high (or low) overall rate structure.

The third point to note from Table 6 is that the absolute cost difference is very high in Massachusetts. Western Massachusetts Electric and Boston Edison nationally Rank No. 1 and No. 2 on this measure. In fact the 6.4 cents kwh differential charged by Western Massachusetts Electric is larger than the total small commercial rate charged by approximately 100 of the 240 utilities studied. The 5.2 cents kwh differential charged by Boston Edison is larger than the total small commercial rate charged by approximately 50 of those utilities. All of the eight Massachusetts utilities examined, including the city of Holyoke, nationally fall in the top half on this measure.

TABLE 6.—SMALL COMMERCIAL ELECTRIC RATES IN MASSACHUSETTS BY UTILITY—JAN. 1, 1980

Utility	Community	Small commercial electric rates			Difference in small commercial and residential electric rates					
					Percent			Absolute		
		Cost of kilowatt-hours in cents	National rank	State rank	Difference	National rank	State rank	Cost difference of kilowatt-hours in cents	National rank	State rank
Boston Edison Co	Arlington Township, Boston, Framingham, Brookline Township, Waltham, Newton, Somerville.	11.3	2	2	85	18	2	5.2	2	2
Brockton Edison Co	Brockton	9.0	26	5	41	137	6	2.6	70	5
Cambridge Electric Light Co.	Cambridge	9.4	23	4	62	64	3	3.6	18	3
Fall River Electric Light Co.	Fall River	8.8	29	6	38	150	7	2.4	90	7
Holyoke, City of	Holyoke	7.9	65	8	36	155	8	2.1	111	8
Massachusetts Electric Co.	Malden, Lynn, Laurence, Medford, Lowell, Worcester, Weymouth Township, Quincy.	8.4	45	7	42	131	5	2.5	80	6
New Bedford Gas & Electric Co.	New Bedford	10.1	12	3	51	98	4	3.4	30	4

TABLE 6.—SMALL COMMERCIAL ELECTRIC RATES IN MASSACHUSETTS BY UTILITY—JAN. 1, 1980—Continued

Utility	Community	Small commercial electric rates			Difference in small commercial and residential electric rates					
					Percent			Absolute		
		Cost of kilowatt-hours in cents	National rank	State rank	Difference	National rank	State rank	Cost difference of kilowatt-hours in cents	National rank	State rank
Western Massachusetts Electric.	Pittsfield, Springfield....	11.8	3	1	119	2	1	6.4	1	1

The absolute difference is, of course, the critical measure for small business. It is the one that affects the bottom line. Where the percentage difference is large yet the absolute difference small, e.g. Palo Alto, CA., rate discrimination may exist but not in sufficient absolute amounts to make a concerted effort to rectify the situation worth the cost. However, in Massachusetts the situation is considerably different. Even among these Massachusetts utilities where the relative amount of rate discrimination appears low, the absolute amount is enough to warrant activity.

Further evidence relating to Massachusetts can be found in the Wilson study. There we find three Massachusetts utilities assessed by rate of return for each user class. Note on Table 7 that in every instance the commercial rate of return was highest by a substantial margin. In the case of New Bedford Gas and Electric, commercial users provided a 49 percent greater rate of return than industrial users and a 177 percent greater rate of return than residential users. It is important to remember that these comparisons are based on all commercial users, not just small commercial users.

TABLE 7

Massachusetts company	Rate of return (percent)		
	Commercial	Residential	Industrial
Boston Edison Co	15.04	8.60	10.95
New Bedford Gas & Electric Co	20.97	7.56	14.03
Western Massachusetts Electric Co	14.12	8.66	9.84

Source: Wilson study.

CONCLUSION

The preponderance of evidence clearly points to substantial rate discrimination against small commercial users in Massachusetts as well as in other parts of the nation. While only a detailed cost-of-service study for each utility can conclusively prove the question as well as establish the absolute amount, the evidence to date is one-sided. Every measure examined leads us to a single conclusion; there appears no evidence to the contrary. In fact, the data are so one-sided that it would seem the burden of proof should be shifted from the small commercial user to those who propose and establish rates.

Small business cannot blame either the utilities or the Public Utility Commissions. Rate making hearings have been open to the public and small business has simply nct participated to an adequate degree. While the conduct of sophisticated cost-of-service studies does not lay within the financial constraints of small businesses and their associations, the expression of concern and the type of data presented today cannot go unnoticed by affected utilities, rate-making bodies, and even State legislatures. It is, therefore, incumbent on small business to participate with the resources available, including any political resources that can be marshalled.

Despite the evidence I do not think it reasonable for small business to expect electricity rates to be rolled back. However, it is certainly reasonable to expect that rates be frozen in future rate makings until parity with other consumer classes is

reached. I believe this is the approach small business will take at future rate making hearings.

Mr. BEDELL. Thank you very much.

Mr. Tearno, do you have anything to add?

Mr. TEARNO. Yes. Very briefly, Mr. Chairman, as a Massachusetts resident I am very pleased this subcommittee has taken the initiative to come to the Commonwealth and hold these hearings on this this important subject.

As Denny mentioned, I am the Massachusetts representative for NFIB, and I handle State legislative affairs in the Commonwealth and have also handled legislative activities in the northern New England States previously.

I want to address the subject of energy tax credits.

We have looked at tax credits in Massachusetts and in Maine. Given the circumstances of the cost of energy in the Northeast, our members have been polled in Massachusetts and in Maine on the subject of extending State energy tax credits to small businesses.

In both States our members favor the extension of such tax credits. Both Massachusetts and Maine have existing laws for residential energy conservation credits. Our membership would favor the expansion of those credits to the small business sector.

In addition, the small business task force, which was formed by Governor King last year, addressed energy as one of its six issue areas. I was a member of that task force. One of the 19 recommendations presented to Governor King in January of 1981 was expansion of these tax credits. So small business at least in Massachusetts and Maine, particularly the members of our organization, would favor having an expansion of the State energy tax credit law so that they would be able to provide, or receive a benefit to increase their energy efficiency. As Denny has mentioned very clearly, it is a serious problem to small business in the Northeast.

Mr. BEDELL. Mr. Mavroules.

Mr. MAVROULES. I have a couple of questions. I appreciate very much the testimony given this morning. It is on the button. But you do confuse me somewhat. I don't have the technical background.

You kept referring to Holyoke. Is it true that Holyoke, perhaps, in the Commonwealth of Massachusetts has indeed the lowest electrical rates in the Commonwealth of Massachusetts because they generate their own power?

I notice you don't have the city of Peabody, either. Being a resident of Peabody, we do generate about 18 or 19 percent of our own power. Is that one of the reasons the rates are lower?

Mr. DENNIS. We didn't go into the reasons why they are lower. I would be reticent to answer one way or another.

Mr. MAVROULES. They are still high. I am just referring to the Commonwealth.

Mr. DENNIS. Yes; relatively so. We have found, in looking nationally, including the Massachusetts utilities, that those that are publicly owned or municipally owned rather than stockholder owned vary all over the board. Some are relatively low in comparison to their immediate environs. Some are relatively high. There seems to be no consistent pattern.

The degree to which each generates its own power doesn't seem to make a great deal of difference. TVA is a prime example of a power generator who then wholesales it to other areas in that region of the country.

The absolute rates charged by various utilities which buy their power from TVA again are all over the board. So I really don't know.

Mr. MAVROULES. When I stated I was a little confused, I refer to the commercial versus industrial. I will eliminate residential for the moment. Why is there a great difference between industrial and commercial, small business versus big business?

Mr. DENNIS. On an absolute basis, one of the reasons for the difference is that there is some degree of cheaper provision of power. In other words, if you do have your own transformer in a huge plant, it is cheaper to provide power to you. There is no question about that.

The fact that you have basically one line coming in, it is cheaper. However, we find that almost from utility to utility, that even beyond these cost of service items, the commercial user is still paying more. The only thing that we can attribute it to is the fact that we have not appeared at public utility ratemaking hearings.

In the good old days of many, many years ago, maybe 20 or something like that, the large firms had their representatives at PUC hearings. As time went on, residential consumers, through various types of advocates, began to have their side heard. We haven't had our side heard.

Mr. MAVROULES. One final question, Mr. Chairman. I appreciate this time.

I take it from your testimony, from both of you, that you favor the extension of the tax credits on the Federal level, tax initiatives.

Mr. TEARNO. Well, I think to make a blanket statement like that might be a little bit difficult for us because of the mechanism that our organization uses; that is, to poll our members.

We have not at this date polled our members nationally on that issue, on extending Federal tax credits. As I said, the question that was posed to our members was to expand existing State tax credits. I think that is an issue that we will probably have to address regarding the Federal tax credits.

Mr. DENNIS. We will be polling it very shortly.

Mr. MAVROULES. How soon do you think that will take place, and when do you think we will have the results?

Mr. DENNIS. It will go into our next publication, which I would estimate maybe will be in a month. Then it would take us probably another month. So before the end of the year, certainly.

Mr. MAVROULES. I would assume that would be forthcoming to the Members of Congress.

Mr. DENNIS. Yes, it will be.

Mr. MAVROULES. Thank you.

Thank you, Mr. Chairman.

Mr. BEDELL. It appears to me that it would be much more meaningful if you would compare it with industrial rather than residential. It is hard for me to understand why, with return on investment, it wouldn't be very simple to compare with industrial. You could take what investment is involved with transformers to an in-

dustrial user and assign a return to that quite easily, could you not?

Mr. DENNIS. The so-called Wilson study, which we referred to, and which I mentioned I believe on table 7, was indeed that general type of study.

The Wilson people did it for 98 utilities in 43 jurisdictions, including the District of Columbia. The problem with proceeding that way is that we look at commercial as a class; in other words, we make no distinction between a large commercial user and a small commercial user. That is why we proceeded in the manner that we did.

What we wanted to do is hold cost of service constant. That is why we proceeded as we did. It was the same as comparing apples and apples rather than apples and oranges.

Mr. BEDELL. I don't think that answers the question I posed. I think it is great. I think it is important that you compare big with small. I think that is something that Congress, among others, would be interested in.

I think in comparing the commercial user with the residential user you are comparing apples and oranges to a great extent. It would appear to me that it would be a little more difficult for you, but what would be of interest to this committee is if you could show how the rates compare to the small commercial or industrial user and the big user based upon rates of return. If you could show that, I think you would really stir some interest.

The political reality is that I don't think Congress is going to get real excited over how small business compares with the residential user. I think Congress would get excited over how small business compared with big business with which they compete.

What I am challenging you to do is the slightly more difficult study, which I think would be beneficial to you in trying to get some changes made. My concern is that I am not at all sure you are going to get a lot of action in regard to saying, "Look, you ought to raise residential rates so they are comparable to the small business rate or lower the small business rate."

Do you understand my question?

Mr. DENNIS. I understand your question. I think I have two responses. One, again, essentially the Wilson study did look at rate of return. I think that is part of it. The second thing is that we have begun a process by which we are comparing the Wilson study on rate of return and the Cabot study, which is the one done for us on absolute costs.

What we are attempting to do is to determine, one, whether in the commercial sector itself there is enormous rate discrimination going on between large and small. We think we have found certain cases where there indeed is. Con Ed of New York appears to be the principal violator on that ground.

I don't have sufficient statistical work done at this time where I can sit down and can explain precisly what those differences are.

If the committee would like, I can certainly have some work done probably by the end of the next week which I could amend to the testimony.

Mr. BEDELL. Well, I am just advising you not as a member of the committee, but as a concerned citizen.

Mr. DENNIS. Surely.

Mr. BEDELL. It would appear to me if you could come forth with some documentation indicating that there is discrimination against small business, be it industrial or commercial, or commercial compared to industrial, if you could show that, I think you would create a lot more interest as far as the public is concerned and the Congress is concerned, than by comparing it with the residential user.

That would be my personal recommendation. I do not know how great a chore that would be, but I for one feel that to discriminate against small business compared to big business is something a lot of Members of Congress do not want to see.

I think utility companies would be hard-pressed to explain why they were doing it, if indeed they were. I think they would have a much easier time explaining why they were giving special rates to homeowners.

Mr. MAVROULES. If I may, Mr. Chairman, I think you are on the button. Let me be a little more candid. If you try to compare residential versus commercial industrial, you are opening up a can of worms, in my opinion, and you are camouflaging the real problem.

I might also suggest to you that in your studies you eliminate residential altogether because, you know, in business they have other incentives that the residential user certainly doesn't have. All they do is pay for a service. Others give a service, perhaps, and they pay for service but get a tax credit or tax incentive. The residential people simply don't have that at their means.

I think the chairman's point is this. I suggest that you follow it up.

Mr. BEDELL. If you do get that, if it is next week or in 2 months, our committee would be very interested in any information that you might have in that regard.[1]

Mr. DENNIS. OK.

Mr. BEDELL. We do want to commend you for the work you have done in this regard. We would like to see small business continue to be able to compete. I am aware of the fine work that NFIB has done on many issues.

Mr. Rosenberg.

Mr. ROSENBERG. Mr. Dennis, in your testimony on the first page you make reference to the study done by Samuel Doctors some years ago. He has done a more recent study at the University of Pittsburgh for the Department of Energy entitled, "Conservation and Small Business, an Exploratory Study." I believe you are familiar with that.

Mr. DENNIS. Yes.

Mr. ROSENBERG. In that study, in a more recent one, the Doctors' study shows that the small business community has already taken steps toward energy conservation in the areas of lowering their thermostats, turning off idle machinery, shutting off heat in unused areas, regular maintenance of boilers, and so forth.

The conclusion that they reach, at least in their preliminary findings, was that there is a direct correlation between the amount

[1] NOTE.—The additional material had not been received by the subcommittee in time for press.

of revenue that that small business generates and the amount of energy conservation work that it is likely to undertake.

Also, in looking at their findings, the larger the cashflow to a small business, the more likely they are to move to other things such as weatherstripping doors and windows, placing timers on light switches, installing storm doors, et cetera.

I have my own conclusions in looking at their data, which indicate to me that perhaps a moving factor here is that the larger the small business is, the more likely it is to actually own the facility in which it is operating.

It would seem to me that the truly small small business, startup type businesses that are retail establishments mostly, are operating out of leased facilities, and that along with having a smaller cash flow as a characteristic, they might also have as a characteristic that they really don't own that property and therefore would not be inclined to make changes in the physical building—better insulation, better storm windows, et cetera.

Could you comment on that, and also just on the general issue of whether the current tax credit structure really applies to the small businessman who is leasing as opposed to the one who owns his property?

Mr. DENNIS. In some of the earlier studies we have done, basically in a study we did in 1977, we found not surprisingly a direct relationship between a small businessman's undertaking in energy conservation investment of any type and whether or not he owns the property. I don't think that is particularly a shocking thing.

We went even further and found that when the individual does not own the property and does not pay the utility bills, he has even a lesser propensity to make an energy conservation investment, or other type of activity which would reduce energy costs.

Further, there were two other correlations which I think are directly relevant to today's hearing. In the first place, the propensity to make an investment or to take some type of action is directly related to the total energy cost.

Now, we also have seen that energy costs as a percentage of sales increase as the firm grows smaller. In other words, the very smallest firms as a percentage of sales have much higher energy costs. Nevertheless, it was the total, the total absolute amount that was directly related.

The second thing we found was no correlation to one's view of the energy problem. At one end of a scale we posited that the energy problem is totally a hoax. At the other end of the scale we posited something to the effect that the energy problem will get more serious immediately and that we will have continual supply interruptions. There were various degrees in between.

We found no relationship between a person's view of the energy problem and whether or not he took that energy conservation investment. It was strictly a dollars and cents matter.

So, getting back to your original point, yes, I think that perhaps that study was a little superficial on the point, in correlating it to revenues and not looking at one's own assets.

Mr. BEDELL. Thank you.

Mr. KULIKOWSKI. Electric rates are set by the State, are they not?

Mr. DENNIS. Public utility commissions.

Mr. BEDELL. We appreciate your testimony very much. We hope you will come forward with some further information.

Our next witnesses are Joseph Mannarino, Small Business Service Bureau of Boston, Mr. Francis X. Doyle, director of management assistance, and Bruce Erikson, Shetland Properties, Inc.

TESTIMONY OF FRANCIS X. DOYLE, DIRECTOR OF MANAGEMENT ASSISTANCE, ACCOMPANIED BY JOSEPH MANNARINO, ENERGY PROGRAM MANAGER, SMALL BUSINESS SERVICE BUREAU, INC., WORCESTER, MASS.

Mr. DOYLE. Good morning, Mr. Chairman, and Congressman Mavroules.

I am very glad to be able to speak with you today on an issue that we feel is very important, affecting small businesses.

The Small Business Service Bureau is located in Worcester. We are an association of the very small businesses that are the start-ups and the people with under 10 employees. Our main function is to provide benefits or services to the very small firms.

One of those services got very much involved with energy, which is why we are here today. Back in 1978, Attorney General Frank Bellotti asked us to come in to intervene before a utility rate hearing to represent small businesses, and the startling facts that we discovered were the surprise of everyone to see somebody in there fighting for small business. They had seen the lawyers for the large firms and the overall homeowners have always been represented, but small business never had so many going to bat for them.

I am very glad to see my friends from NFIB addressing this, because it is a national issue.

We have been involved on a case with Boston Edison where, to address both of your concerns, Congressmen, of the big business and the small business, small business had never been represented. I would like to bring up a couple of details from that case, if I could.

There are several things that can be done without even taking the first steps of conservation for a small business to cut down their energy bill, and one of them which, quite frankly, seems out of line is to make sure that the business is on the correct class rate.

One member of the Small Business Service Bureau discovered a $1,000-per-month extra charge that they were paying simply for being on the wrong electric rate. This is not a regulatory problem. It is simply a problem with the administration within a utility. It is a very simple thing to switch. It can be done anonymously by the business to avoid any possible other effect.

The second point which we are very glad to see people around the country becoming more concerned on is they can fight for more equitable rates to stop the great disparity that exists between the consumption inspiring declining block rate that exists for industry and the very high rates charged for the very small commercial businesses.

To address your point of the large industrial consumer versus the small business, for Massachusetts Electric, which is the electricity here in the area, they now charge 27 percent more per kilo-

watt for small commercial users than they do for the large industrial business. This gets back to the definition of small business, which is another problem which we are not here to address today.

As an association, SBSB cannot afford the legion of utility rate lawyers and analysts that you need to represent small businesses at all the rate hearings. Our members are very much opposed to regulation of any kind, but when a regulated industry drives up their costs as much as has been true for electricity, over 80 percent favor strong definitive action to eliminate what is in effect a cross-rate subsidy between the declining block for industry and the rates for the small commercial business.

Here in Massachusetts the burdens of the rates fall greatly on the very small businesses. Our neighbors to the North in New Hampshire, however, have a range much closer to an equitable rate for the large firms and the small businesses, an example we may well heed here in Massachusetts. And New Hampshire is still very much known for being a key State to do business in. If you talk to the Governor up there, you will find that very much to be true.

Can these problems be addressed legislatively? The Public Utility Regulatory Policy Act of 1978 both addressed and created problems in this area. When Boston Edison back in 1978 filed a proposal to comply with the time-of-use rate requirement, which is to charge similar to phone charges, more for the daytime, it had such disastrous effects that they are still in hearings now, 3 years later, on this one issue.

Surely the cost of 3 years of research and legal representation is a clear waste of revenue. The proposal that they did make in this instance would have increased rates for small commercial users by up to 60 percent while providing the large industrial plants discounts of up to 20 percent. So they took a rate structure that was already out of sync as far as the small businesses went, and made it even worse, because the large factory can run three shifts, but it is very difficult to buy a suit at 3 in the morning at a small business.

These are just a few of the examples that we have uncovered in our assistance with small businesses.

With us today is Joseph Mannarino, who is our energy program manager, who is running a program for the Small Business Service Bureau and the Massachusetts Office of Energy Resources, who has worked very much in the conservation area.

Mr. MANNARINO. Good morning, Mr. Bedell and Mr. Mavroules. Glad to be here this morning.

In 1980, the Small Business Service Bureau accepted and matched a grant from the Department of Energy through the Massachusetts Energy Extension Service to provide technical assistance to small businesses in both Worcester and Greenfield. The first year it was just Worcester. The second year, 1981, we expanded the program to include Worcester and Greenfield.

This program, along with the regulatory impact program that Frank just talked about, are programs we are going to use to draw our information from to answer the questions that you are looking for answers to.

In particular, what are the characteristics of small business energy usage?

In answering this question, it should be understood that the businesses that we have been assisting are very small businesses. We looked only at businesses with less than 50 employees, the mom and pop variety, who typically had 4 or 5 employees, and whose gross receipts were in the neighborhood of $50,000 to $250,000 annually, marginal businesses that are extremely conscious of their cashflow.

Nearly all of the businesses surveyed were retailers, professional service specialists such as lawyers, doctors, insurance agents, very small businesses in general. It would appear that most of the businesses are not energy intensive. Energy costs were less than 5 percent of the gross receipts in most cases. There are, however, a few categories of small businesses that are energy intensive, such as restaurants, bakeries, laundries, car washes, and some small manufacturing and processing firms.

By and large, the small businesses were not energy intensive. It was below 5 percent of their gross receipts. We are not saying, however, that nonenergy intensive businesses are not concerned about escalating fuel costs. As mentioned above, many small business owners are extremely conscious of their cashflow and are typically riding on a slim margin of profit. Rapidly escalating costs dig directly into their profits and a doubling of energy costs can put a business in the red.

From a special telephone survey of small businesses in the Salem area, identical to the survey we used in our grant program, we found the following results: 85 percent paid for their own utilities; 55 percent own their place of business; 15 percent did not pay their own utilities or own their businesses.

From these results, we can see that it is in the interest of at least 50 percent of the small businesses surveyed to make improvements in their buildings, since this will not only cut their energy dollar costs, but also improve the resale value of their buildings.

We also found over 50 percent of the local small businesses spend between $1,200 and $3,000 per year on energy—oil, gas, and electricity. This may seem low, but keep in mind that according to the Northeast Solar Energy Center, 56 percent of New England's commercial businesses use oil as a principal fuel, 33 percent use electricity, and only 10.6 percent use gas.

So, we see that the energy cost figures which we tabulated in our telephone survey have increased, along with the price of oil, about 125 percent in the past 2 years. Because of this recent inflation in fuel costs, the percent of energy costs relative to the gross receipts has risen from something less than 1 percent into the range of 1 to 4 percent, and as fuel prices continue to escalate faster than inflation, energy costs will surely rise beyond the 5 percent of gross receipts as mentioned earlier. This digs deeply into the pocket of the Nation's small businesses.

As a result of our audits of Worcester small businesses, we found that space heating and air-conditioning are the largest energy users. In New England, over 80 percent of the space heating is derived from oil, either as fuel oil or oil-generated electricity. As space heating is the largest user of fuel, small business energy au-

diting can be very similar to a residential situation where infiltration and inefficient old heating systems are major problems.

It is not uncommon to find a small business heated by an oil-fired steam-heating system converted from coal that is 30, 40 or more years old. These ancient relics were quite adequate when fuel oil prices were 10 cents per gallon, but with present fuel costs, their inefficiency cannot be tolerated. In some cases, new heating equipment will bring the heating plant's efficiency up from 50 percent to 80 percent.

Infiltration is obviously a problem with retail stores that have frequent customer traffic in addition to the usual leaky openings of doors and windows. A unique aspect of many commercial buildings' infiltration problem is the garage doors. Car dealerships, car and truck service centers, and other businesses that have daily freight delivery, all lose tremendous quantities of heat when the overhead doors are opened. An open garage door can turn over the entire air volume of a small building in a matter of minutes. These large doors typically have a very low-thermal resistance (R-value) and fit so poorly that they lose large amounts of heat even when closed.

Windows, especially display windows, are also a big energy loser in a small business, as they are usually only single glazed. It is not unusual to find a retailer whose entire store front is a large display window. A single glazing has an R-value of one, which is quite poor when compared with the DOE recommendation of an R-14 for walls.

Another big energy user for retail stores is lighting. Many retailers have purposely overlit their stores in order to not risk losing sales. Spot lighting or task lighting is usually done with incandescent lamps, which are the most inefficient method of illumination.

A fourth major area of energy usage is refrigeration. For small markets, restaurants, or food processors, refrigeration is a significant cost. Fortunately, there have been some major advances in heat reclaiming which will be discussed in the section of this report pertaining to what businesses can do to conserve.

What can individual businesses do to reduce energy consumption?

As mentioned in the previous section, there are 4 major areas of energy usage: space heating systems, windows and doors, lighting, and refrigeration. Each will be discussed separately, and a short recommendation given.

There are two avenues to fuel conservation in heating plants. The first avenue is to reduce demand by lowering thermostats, and lessening heat loss by insulating, thereby reducing infiltration. The second avenue is to improve the efficiency of the heating system by reducing the heat going up the flue.

For small businesses, the first avenue is usually the more desirable because the improvement cost is usually very low. It costs nothing to turn back a thermostat, and it costs very little to caulk and weatherstrip doors and windows. Insulating, adding vestibules, and other more expensive improvements are not as popular with small business people since the paybacks are usually spread out over 3 years.

What we have found is typically a payback of over 3 years is not going to be acceptable to small business. They want very quick paybacks.

For improving the efficiency of heating systems, there are a multitude of gadgets, gimmicks, and devices that can be added onto an existing system. Usually the problem is that the whole system has to be replaced. It is usually too old. The new technology is so much better. You can bring it from a 50-percent efficiency up to an 85-percent efficiency very easily.

For the garage door problem that we have mentioned, we usually suggest vinyl strip doors or thermal air curtains. These two suggestions are quite effective; however, both have major practical drawbacks. The strip doors have a very bad reputation with new car dealers because they have been known to scratch the car's finish as it passes through the door. The thermal air curtain works well, but is usually so expensive that its installation cannot be justified. Overhead door technology must be improved for the present fuel-price climate.

For the single glazed window problem, there are many retrofit measures. One can find a number of inside storm windows and window insulations that are priced to give a fairly quick payback and consequently are attractive to the business owner.

For excessive lighting problems, the most common solution has been delamping. Most business owners have already delamped to some extent before we even arrive, probably as a result of an effort by the Massachusetts State Building Code Commission, in 1978, to reduce excessive lighting levels. Energy efficiency has also been aggressively pursued by the large lamp suppliers that now have energy efficient lamps and ballasts.

Also, several add-on devices can be used with large-scale fluorescent lighting to reduce demand, such as variable potentiometers and power factory improvers. Both of these systems are quite effective and have very good paybacks.

The answer to excessive refrigeration costs is new and very innovative technology. In the past, the heat which was extracted from freezer chests was usually dumped outside. New devices have just appeared on the market which can capture this waste heat and use it for space or water heating. This type of heat reclaim should become more and more attractive as smaller and less expensive devices reach the market.

The bottom line for all of the above-mentioned improvements is the payback. Until now, most small businesses have made most of their improvements by the seat of their pants, which may have led to the disappointment of some. Now, with the tremendous range of energy management products and their increased sophistication, a businessman would be very wise to have a trained auditor analyze his building's energy use. The auditor can do life-cycle costing, paybacks, and return values for all new energy improvements to insure that the business owner is spending his money efficiently. Because of the high interest rates and lack of tax advantages facing a residential user, a business owner must be very conscious of the economics of energy improvements.

Mr. BEDELL. Thank you very much.

Mr. Erikson?

TESTIMONY OF BRUCE A. ERIKSON, VICE PRESIDENT, SHETLAND PROPERTIES, INC., SALEM, MASS.

Mr. ERIKSON. I am Bruce Erikson, vice president of Shetland Properties, a business here in Salem. We are an owner-operator of a large industrial park here, but that may be a misnomer in that all of our tenants are small businesses, since under some of the definitions here today many, many of them operate with less than 50 employees, but they all have the same energy use problems that Mr. Mannarino was speaking of.

I am going to confine my remarks to how we, as the supplier of the heat for this facility, have been able to do something in the energy conservation field.

Shetland Properties' main offices are located in Salem, Mass. We operate large multitenant industrial parks in Massachusetts, Indiana, Illinois, and Canada in typically older building complexes originally built for and occupied by a single user. Most of the space was built between 1915 and 1922. The buildings have the original heating systems which are antiquated by today's standards.

Two of our complexes in Massachusetts were vacated in the early fifties by textile mills seeking cheap labor in the south. Energy was not a problem then. Single users for 1- to 1½-million-square-foot structures were rare, and these buildings languished without industry in them for many years.

Eventually Shetland promoted multitenanting of these properties and has operated this type of business for the past 25 years and with occupancies of 90 to 100 percent.

Now energy is a problem, and it has crossed the minds of many of our 175 industrial space users to move south for cheap power, as well as other economic incentives for migrating businesses offered by these States seeking to employ their workers. Their energy is a larger component of their operating budget than their rent.

However, our Yankee ingenuity and patriotic fervor has led many companies to fight back in the face of the world energy crisis, and the growing disparity between the price and availability of energy in the Northeast versus other parts of the country. Shetland is one of those companies.

Shetland consumed 17,000 barrels of oil back in the late 1960's to heat the 1.5 million square feet of space in Salem. The oil embargo of 1973 created a technological challenge and changed the view of the world energy supplies radically.

Since then, the consumption at this facility has been brought under control; thermostats have been lowered to 64 degrees in manufacturing areas and 50 to 55 degrees in warehouse space.

An insulation system was developed by us to reduce glass area by over 50 percent. Zones were established in the piping of the heating system to systematically heat areas only to their required levels, micro processor-based controllers report the efficiency of the boilers and the heating system giving vital information on the day-to-day operation of all the zones, allowing scrutiny of the hardest to heat areas.

The result: 17,000 barrels reduced to 5,000 barrels by 1980–81 season. 12,000 barrels at today's price of $32 per barrel represents

$384,000 per year of savings. Our space users have shared the advantage of our controlling the costs through lower rental rates.

Basically, I want to get down to what small business can do, to reduce consumption.

One of those is to basically take stock of how you use your energy and determine the largest component, where you usually have the largest opportunity to save, and then to find ways to make that reduction, to find either in-house personnel who have the insight into some of the solutions or find an energy management company who can help you with some of the tried and true ways of being more efficient in your energy use.

Basically, the cost and payback of these opportunities becomes all important. We would take the position that it is vitally important for the economy of our region, and the country as a whole, to be free of the influences of foreign oil, and to the extent that consumption can be curtailed within our own domestic means of energy supply, every incentive should be made.

The reduction in any Federal tax incentive would be counter to this position. So we would be very opposed to the reduction of any incentives. We would ask that the audits that have been promoted by tax incentives continue to be promoted.

Thank you.

[Mr. Erikson's prepared statement follows:]

PREPARED STATEMENT OF BRUCE A. ERIKSON, VICE PRESIDENT, SHETLAND PROPERTIES, INC., SALEM, MASS.

Mr. Bedell, Chairman, Shetland Properties' main offices are located in Salem, Massachusetts. We operate large multitenant industrial parks in Massachusetts. We operate large multitenant industrial parks in Massachusetts, Indiana, Illinois and Canada in typically older building complexes originally built for and occupied by a single user. Most of the space was built between 1915 and 1922.

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The results: 17,000 barrels reduced to 5,000 barrels by 1980–1981 season. 12,000 barrels at today's price of $32.00 per barrel represents $384,000 per year of savings. Our space users have shared the advantage of our controlling the costs through lower rental rates.

The opportunity exists to reduce consumption that dramatically for most companies. But it costs a lot of upfront money to realize the major energy/cost reductions.

Similar reductions in fuel consumption have been realized at our other facilities.

Shetland has now formed a separate but related company called "Micro Energy Conservation, Inc." to market to other small businesses the systems and strategies that have proven successful for close to 6,000,000 square feet of industrial space.

"Micro Energy Conservation, Inc." was formed knowing that if businesses were to compile from their existing records their energy use patterns and compare these with engineering models of efficient systems. The opportunities could be quantified. These studies are known as energy audits, and more businesses need a demonstation of their value.

The National Energy Conservation Policy Act promoted the use of energy audits in schools and hospitals by paying up to 50% of the cost of the inspection. There is no question this prompted action to have energy audits done. School boards and hospital directors finally had an idea where their overhead could be reduced without cutting services. More of this should be promoted through similar governmental incentives for all energy users and especially small businesses.

The first thing a small business can do to reduce its energy consumption is to detail how it uses the energy it buys. This will help to establish the largest component of its energy usage where the opportunity is usually the greatest to reduce the energy bill.

The next step is to find ways to make the reduction. Some businesses have in-house personnel who can engineer solutions to energy reduction. Others use energy management companies.

The goal of optimizing the energy efficiency of a building structure or a manufacturing process for a small business requires the implementation of a system that demonstrates its immediate effectiveness, is easy to maintain, and is flexible to change as the process or use changes.

The cost and payback projections need to be realistic and consideration given to implementing the project in stages.

The final step for reduction in fuel usage at Shetland is through the installation of solar heating panels installed on the roofs of the buildings.

Without the tax incentives, we probably can't embark on the project which would be too bad since we've come this far to be independent.

Before conservation efforts, the idea of completely solar heating the facility was out of the question considering the fuel displacement necessary, but now it's entirely feasible.

We feel it is vitally important for the economy of our region and the country to be free of the influences of foreign oil on our energy supplies and that conservation of the type previously supported by the Federal Government must be continued and even broadened so that the country can live within its energy means.

Mr. BEDELL. Thank you very much.

Mr. Mavroules.

Mr. MAVROULES. Thank you very much, Mr. Chairman.

Let me commend all three gentlemen for their excellent testimony here this morning.

Bruce, I can relate to the Shetland Properties. It is about a mile down the road, Mr. Chairman. They have done a magnificent job. They have superb management. With their technical background they have been able to turn an old piece of property around. It is producing today between 90- and 100-percent occupancy. I want to commend you for a job well done.

I take it all three of you are in favor of retaining the tax credits now given to small businesses as part of our program in Congress?

Mr. DOYLE. Very much so. We are very concerned, Congressman, by recent unofficial rumors regarding the possible cancellation of the energy credits. Our feeling is that it is an investment that is made in the idea of energy conservation, and an investment that is well-paid back from both the point of view of profitability for businesses and a trade balance point of view.

Mr. MAVROULES. I am not sure they are rumors. I believe there is some truth to what you have been hearing. Therefore, we are trying to form a coalition. We have a number of Congressmen who have cosponsored legislation in two areas for tax incentives and tax credits. Hopefully we can be helpful.

I have one other question. Are you familiar with the strategy papers put out by the New England Congress back in July of 1980? Have you read that? I will make this part of the record, Mr. Chairman.[1]

It is a very interesting proposal. Perhaps you might have some knowledge of it. That is the proposal on an energy program. It has something to do with what you are doing in your business.

Have you been asked in any way to participate in this study? Do you know the status of it? Do you know what has happened to it?

Mr. DOYLE. Yes. We have met with Secretary Jeff Fitzpatrick, who drew up the proposal earlier in 1980. Part of the program we are using on a grant from the energy office.

To my knowledge, over a year ago until now that has stayed in limbo. In talking to people in the energy office, both in Boston and Washington, I don't think that has progressed anywhere from the stage of having been submitted.

Mr. MAVROULES. What do you think of it?

Mr. DOYLE. I think the idea is very good. It is basically a way of linking public sector resources to private sector resources. We are very much in favor of that. If it can be applied in any way, I feel it is a very practical idea.

Mr. MAVROULES. I appreciate your response.

I have no further questions, Mr. Chairman.

Mr. BEDELL. Thank you very much. I also want to commend you for the work you are doing. One quick question: How does a small business get one of these energy audits that you mentioned Mr. Mannarino?

Mr. MANNARINO. Under the grant program that we are working under right now, we are budgeting 30 free energy audits for small businesses. We select them through a process of direct mailing, through telephone interview, and then possibly even a personal interview.

It is based on a couple of different things: How much of an energy usage they have, how bad a problem they have, and if they realize the problem and they are willing to do something about it.

Mr. BEDELL. How is that funded?

Mr. MANNARINO. Through DOE to the Massachusetts Energy Extension Service.

Mr. BEDELL. Do you understand that is one of the programs being eliminated?

Mr. DOYLE. We do.

Mr. BEDELL. So that will no longer be available?

Mr. MANNARINO. Correct.

Mr. DOYLE. One of the ideas that Secretary Fitzpatrick has asked us to do is to set up a system that can be used as a service to small businesses. The free aspect, of course, would go into the grant being

[1] See app. B.

extinct at the end of the year. But it is a service that we can provide. We have created computer software to do that.

Mr. BEDELL. Who would pay for it?

Mr. DOYLE. It would be up to the individual business.

Mr. BEDELL. They pay the cost?

Mr. DOYLE. Yes.

Mr. BEDELL. Thank you. We appreciate very much your testimony.

Mr. DOYLE. Thank you very much.

Mr. BEDELL. Our next panel is Edward Molin, Berkshire Manufactured Products, Inc.; Alex Wormser, Wormser Engineering; and Maynard Gassman, Maynard Plastics, Salem.

Gentlemen, we have seven panels. We have completed two of them, and about half of our morning is gone. The only thing I know to do is after each person has talked for 5 minutes, I will remind them their 5 minutes are up. If we don't do that, we will not be able to hear from some of the later witnesses, and I don't think that would be fair.

I don't want to be unfair to you gentlemen. I would ask you to summarize where you can. I am sorry we don't have more time, but we are just going to have to get through by as close to noon as we possibly can.

TESTIMONY OF EDWARD G. MOLIN, PRESIDENT, BERKSHIRE MANUFACTURED PRODUCTS, INC., NEWBURYPORT, MASS.; ALEX WORMSER, PRESIDENT, WORMSER ENGINEERING, INC., MIDDLETON, MASS.; AND MAYNARD GASSMAN, PRESIDENT, MAYNARD PLASTICS, SALEM, MASS.

Mr. MOLIN. I am Edward Molin. I am the president of Berkshire Manufactured Products, Inc., in Newburyport, Mass. We are manufacturers of custom metal stampings.

Despite many added capital expenditures, we have found our energy costs constantly increasing. We have spent thousands of dollars on storm windows, ceiling fans, and added insulation. Our heating bills still increase. This is one cost we seem to have no control over.

In the Northeast the cause is high energy costs and the effect, a decrease in the ability of business and industry to compete with the low-energy States in the South and West.

The degree to which a business is affected by escalating energy costs is dependent on the nature of that business. A manufacturer who is dependent on great quantities of heat for processing is naturally more drastically affected than one whose processing requires less power.

Overall those in small business, faced with the reality of large increases in expenditures for fuel, have, in the interest of survival, become avid supporters of conservation measures; insulating buildings and lowering thermostats. Beyond that, many firms are involved in the use and exploration of less traditional means of energy conservation.

Solar energy is one such means. Proponents bill it as being practical and economical. Generous tax incentives help to make solar a more attractive alternative or backup system for the small busi-

nessman to consider. We currently have a building under consideration, a 10,000-square-foot building in which I am planning to use solar for hot water.

In the interests of shortening this, I am going to take a few shortcuts here.

There is another business concern in our area with which I am very familiar who last year had an expenditure for energy of over one-half million dollars, or 30 percent of their total operating costs after all viable conservation measures had been taken.

Another concern up in Newburyport in our industrial park had similar statistics—a 30-percent rise in energy costs last year, a 50-percent rise over a 2-year period. Their company has ceiling fans and also recirculates heat from a plating process. Both of these firms were actively engaged in seeking the most energy-efficient means by which to run their plants. They both are fairly new modern buildings.

Many in the small business community, including myself, are concerned that shortsighted government will take a very difficult situation and sometimes make it impossible. Massachusetts State Senate bill No. 544, proposed by State Senator Sharon Pollard, proposes a 20-percent reduction in residential gas and electric rates to be absorbed by the industrial and commercial sector.

This proposed legislation is shortsighted, creating a small savings for the consumer today, yet potentially threatening jobs in the future. Although this is a State bill, it is an indication of the attitude of the legislature toward the small business community.

Within the small business community there is a strong desire to voice concerns about this issue and others which affect the business climate. Unfortunately, this is coupled with a desire to remain anonymous, due to a concern that by identifying themselves they then become vulnerable to attack by facets of both State and Federal Government who seem to have an antagonistic attitude toward the business community.

As a businessman myself, I can say we ask for no special dispensation. What we would like from our representatives and the government in general is a greater awareness of the role of small business within the community.

The small business community in New England faces a special challenge in the energy-scarce years ahead. Awareness on the part of both public and private sectors is necessary to meet it.

The government on both State and Federal levels must allow the natural entrepreneurial spirit of the business community to meet this challenge through relaxation of overzealous regulation and a more positive attitude toward the business community.

Thank you.

Mr. BEDELL. Thank you, Mr. Molin.

[Mr. Molin's prepared statement follows:]

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fans and added insulation. Our heating bills still increase. This is one cost we seem to have no control over.

In the Northeast the cause is high energy costs and the effect, a decrease in the ability of business and industry to compete with the low energy states in the south and west.

The degree to which a business is affected by escalating energy costs is dependent on the nature of that business. A manufacturer who is dependent on great quantities of heat for processing is naturally more drastically affected than one who's processing requires less power.

Overall those in small business faced with the reality of large increases in expenditures for fuel have in the interest of survival become avid supporters of conservation measures, insulating buildings and lowering thermostats. Beyond that many firms are involved in the use and exploration of less traditional means of energy conservation.

Solar energy is one such means. Proponents bill it as being practical and economical. Generous tax incentives help to make solar a more attractive alternative or backup system for the small business man to consider. The Federal Government encourages solar investment by a 40 percent tax credit ($4,000 maximum). Massachusetts also offers a 35 percent tax credit ($1,000 maximum) on the remainder. Thus a $5,000 investment in solar hot water would cost $2,000 after deducting these tax credits. For corporations the cost of solar installation can be deducted in full from Massachusetts corporate taxes and in part from Federal taxes.

The Wilkinson Viscosity Stabilizer promises a 15 to 20 percent savings through better oil burner performance. This device heats and thins number 2 fuel oil under controlled conditions that enable the oil to be atomized and burned at the best temperature for complete efficient combustion.

The Small Business Administration has energy loans available to start, continue or expand small businesses that are developing, manufacturing, selling, installing or servicing specific solar energy and energy conservation measures. Firms eligible included those involved in production or conservation in: Solar energy—Solar thermal energy—Hydroelectric power equipment—Wind energy—Equipment used to produce energy from wood, waste, grain or other biomass sources. Equipment for industrial congeneration of energy and products or services using devices that will increase the energy efficiency of existing equipment.

Firms installing or undertaking energy conservation measures within their own plants or offices are available for SBA loans through the regular loan program.

This Small Business Solar Energy and Energy Conservation loan program represents the recognition by the business community and the SBA of the need for exploration of alternative forms of energy and conservation.

Many in the small business community are discouraged with the bad press the Nuclear Power Industry has received in the past few years. Feeling that it is an efficient clean and abundant alternate energy source.

The United States has abundant coal reserves, with proper environmental considerations it represents another viable option.

A business concern in our area, with which I am familiar, last year had an expenditure for energy of a half million dollars or 30 percent of the total of their operating costs, after all viable conservation measures had been taken. Another concern voiced similar statistics, a 30 percent rise in energy costs last year, a 50 percent rise over a 2 year period. This company has ceiling fans and also recirculates heat from a plating precess.

Both of these firms were actively engaged in seeking the most energy efficient means by which to run their plants.

Many in the small business community including myself are concerned that shortsighted government will take a difficult situation and make it impossible. Massachusetts State Senate bill no. 544 proposed by State Senator Sharon Pollard proposes a 20 percent reduction in residential gas and electric rates, to be absorbed by the industrial and commercial sector. This proposed legislation is shortsighted, creating a small savings for the consumer today, yet potentially threatening jobs in the future. Although this is a state bill it is an indication of the attitude of the legislature toward the business community.

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The small business community in New England faces a special challenge in the energy scarce years ahead. Awareness on the part of both public and private sectors is necessary to meet it. The government on both state and federal level must allow the natural entrepreneurial spirit of the business community to meet this challenge through relaxation of over zealous regulation and a more positive attitude toward the business community.

Mr. BEDELL. Mr. Wormser?

Mr. WORMSER. Mr. Chairman, I would like to address two questions that were posed. One is what our product can do to help small business, and the other is what is Washington's legislative climate doing to our business, which is also a small business.

Ours is a single-purpose company. We started 8 years ago to try to make coal burners that are clean and also affordable. As of a year ago, we were a research company with DOE funding. This year I am happy to say we are a 100-percent commercial organization with a couple of million dollars worth of backlog.

The first question, then is: On what basis is our product likely to be of use? One observation, of course, is that coal is still the perhaps last bargain on the scene. It is available for something like $12 a barrel equivalent, or 30 cents a gallon of oil equivalent.

The challenge we have posed is: How do you avoid squandering that economy on equipment? The technology that we are involved in, which includes fluidized bed combustors, does help the economics of coal burning in three ways.

One is that the equipment itself is relatively small. Second, the scrubbers that are normally needed for pollution are eliminated. Third, the coal handling systems are significantly improved because you use crushed coal, which can be conveyed in a dust-free fashion.

Fluidized bed combustion has been used for only the last two decades. There are three companies now with industrial orders in this sector. Two of them are small companies.

Our company makes fluidized bed combustors with a couple of advantages. One is that they can be used to convert existing gas or oil-fired boilers to coal. Second, they can be used to cogenerate electricity.

Our equipment in general is of use to companies where the energy bill is a relatively significant factor. Often the energy bill is larger than the total corporate pretax profit in industries such as textiles, chemical, and paper, which is very important here, in the Northeast, as is the leather industry.

Our equipment is available in sizes from about 10,000 pounds to 100,000 pounds of steam per hour, which covers about two-thirds of industrial steam use.

We are also apparently of use to people in the institutional areas, such as shopping centers and hospitals, which have high loads around the year, and also to schools where the energy and utility bill often are 20 percent or more of the total budget.

I would like to comment very briefly also on the way in which what you folks in Washington are doing affects us in selling these coal burners. There are basically three areas—I am not sure all three of them are of interest to the subcommittee.

First of all, the pollution area. The Clean Air Act amendments, which are also now undergoing reconsideration, seem to me are being—there is discussion of them being—softened because the added cost of burning coal cleanly would reduce its use.

We think of that as a minor tragedy, now that we have a technology which in fact can burn coal cleanly at about the same cost as the traditional ways, that this legislation should be weakened. We are certainly in favor of its being continued in its present spirit, the Clean Air Act.

The second impact that Washington legislation has on us is the result of a number of pieces of legislation affecting the overall financial structure. Of these, the deregulation of gas and oil have been the most important to us.

In fact, they have been more important than the energy tax credit by perhaps a factor of two or three, which is to say if there is a 10-percent increase in the cost of fuel, that will be perhaps two or three times as important as a 10-percent reduction in the effective cost of equipment.

In that sense, our product is a bit different from, say, a straight conservation measure such as insulation, where the 10 percent would be a direct bearing. In the case of a piece of equipment like a coal burner where you are talking about differentials between the cost, say, of oil and the cost of the coal plus its use, there the remaining price differential is much more sensitive to the price of the oil than it is to the equipment tax credit.

I don't know if I have expressed that too clearly, but there is some difference.

I am not arguing against the tax credit, but I say it is less important to us than the absolute costs of the fuel.

Mr. MAVROULES. If they give you the tax credit, will you take it?

Mr. WORMSER. We think we will, yes.

At the present time our producer seem to be economic to a significant number of industrial users. Our concern, if there is one, really deals with the next 2 or 3 years. Very specifically, this is a concern that has not been expressed. It deals with the stability of OPEC. Our thought about it is as follows.

In the last 2 years OPEC has lost about a third of its market primarily due to conservation and fuel switching. That third loss of market really only represents about 8 percent of free world use of gas or oil.

We don't think it is all that unlikely that the free world might drop by another 8 or 10 percent, in which case OPEC will lose another half of its market. There is a good possibility that OPEC, under those circumstances, would lose its function as the dictator of world energy prices.

If that happens, history would seem to indicate that there would be a wide swing in the price of fuel in the next 2 or 3 years. Companies like ourselves might very well not survive that kind of a situation. Then, when the next swing comes along, the industry would be faced with another 8-year-startup period for getting some equipment that would be suitable.

I am not sure this issue of stability of prices has at all been addressed, but our reaction to it is that all of the safety net pieces of regulation, like the Fuel Use Act, which are now being dismantled,

might yet be of use in this next period of time to help provide some stability that might otherwise not exist.

I would like to mention very briefly the Department of Energy. Our company has had relatively good success with the Department of Energy. The Department of Energy has put about $1 million worth of grants in our direction. Nevertheless, we were one of the first to be cut, compared to the larger companies, whose projects were protected. This is despite the fact that our company had two of the three advanced research projects in the fluid bed combustion area during the last year.

I think in general it is due to a certain level of discomfort that the Department of Energy has in dealing with companies as small as ours in these heavy industrial sectors. Still, two of the three companies involved in getting fluid bed combustion into the commercial sector have in fact been small companies.

So, I think if there is to be a continuation of DOE on any basis, I would promote the notion that perhaps there would be a small company set-aside for research.

Mr. BEDELL. Thank you.

[Mr. Wormser's prepared statement follows:]

PREPARED STATEMENT OF ALEX WORMSER, PRESIDENT, WORMSER ENGINEERING, INC., MIDDLETON, MASS.

Mr. Chairman, I'd like to address two of the questions under consideration, namely:

1. What our company's product might do to help reduce the fuel bills of small business, and

2. How we, ourselves a small business, perceive the energy-related legislation currently under consideration in Washington.

First, I'd like to give you a thumbnail sketch of our company. Ours is a single-purpose company, formed nearly eight years ago to find a way to burn coal cleanly and in a way that also is affordable.

As of a year ago, we were a research company, with all of our revenues of about $¾ million coming from DOE grants. Today, I'm happy to say, all of our revenues are from commercial orders, and we have a backlog of about $2 million. In the present climate, we are very optimistic about our prospects for future growth.

Now I'd like to address the first question, namely, what can our product do to help small business.

The coal burner we make is used to convert boilers to coal and generate steam. Coal is the last of the energy bargains, selling for only $12/barrel-equivalent, or about 30 cents a gallon, even in New England, which is relatively far from the coal fields. The challenge of coal has long been and continues to be: how do you avoid squandering the savings in fuel prices—on equipment costs?

Fluidized-bed combustors—into which category our coal burners are classified—do several important things at lowering the cost of burning coal.

1. The equipment itself is smaller and cheaper than traditional coal burners.

2. They eliminate the cost of a scrubber, that is otherwise usually needed to meet pollution requirements, and adds about ⅓ to the cost of a conventional industrial coal system.

3. It provides a major improvement to the coal handling by using crushed coal instead of coal lumps. Since crushed coal can be conveyed, the dust nuisance and reliability problems of conventional coal-handling systems are minimized.

Fluidized bed combustion is a new technology that has been under study since the 1960's, but hasn't been offered for sale until two years ago. There are now three companies with commercial orders in the United States.

Our product shares the above advantages of FBC's, and has two additional features:

1. It can be used to retrofit existing gas or oil boilers.

2. It can be used to cogenerate, producing both steam and electricity, possibly with a gas turbine, whereby as much as a third of the heat is used to generate electricity.

A typical customer of ours uses steam year around, and around-the-clock, and will include companies within most of the industries for whom energy costs now exceed their after-tax profits: paper, chemicals, textiles, steelmaking, food processing and the like. Some of our potential customers are commercial, like hospitals and shopping centers, or schools, where utility bills also are ⅛, and more, of total operating budgets.

For our industrial customers, the payback on equipment must be under 3 years, which we can achieve under present conditions. Our equipment is available in sizes ranging from 10,000 to 100,000 lbs/hour of steam, which covers about two-thirds of the process-steam market.

I'd like to reflect now on how Washington affects us. What Washington does affects us in three ways: its pollution regulations; various forms of financial legislation; and DOE. I'd like to comment briefly on all three.

1. POLLUTION REGULATIONS

The regulations affecting pollution standards, and particularly the Clean Air Act, are being challenged in part because they have made coal less economic. But with fluid bed combustors, burning coal cleanly doesn't cost any more, anymore; it would be minor tragedy, in our opinion, if the country gave up on the battle for clean air just when victory was in sight. In short, I hope the Clean Air Act's principal objectives are retained in the current debates.

2. LEGISLATION AFFECTING FINANCES

This covers several pieces of legislation, including gas deregulation, the 10 percent tax credits for energy equipment purchases, and the general tax schedules identifying depreciation periods (which is ten years for our equipment, less than it's been but still quite long). There is other legislation, namely the Fuel Use Act, which is only indirectly financial.

At present our product is economic without further incentives. Of these pieces of legislation, gas decontrol is the most important to our continued welfare, but any combination of economic conditions that allows us to offer equipment with a three year payback is our goal.

Our concern, if there is one, is for the near-future. OPEC has now lost a third of its market in the last two years, primarily because of fuel switching and conservation. That most of this conservation and fuel switching has been at OPEC's expense is to be expected, because oil is the costliest fuel around. But the one-third reduction in OPEC's demand has amounted to only eight percent of the free world's energy demand, and it isn't all that hard to conceive of another eight percent reduction in the next year or two. If this happens, OPEC would lose half of its remaining market, and with it, may well lose its ability to dictate world energy prices.

Without a price regulator such as OPEC or, before it in this country, the Texas Railway Commission, history has shown that fuel prices are subject to very wide swings. Our company should continue to do well if oil dropped to $25 a barrel, but may not survive if it falls much below $20. None of the legislation currently on the books would do companies such as ours much good in this situation, but it would be a pity if it took us, or another company like us, another eight years to get back to our present position after the next, inevitable, cycle in fuel prices.

In sum, I'd like to see some consideration given to reviewing the Fuel Use Act, which I understand is slated for the scrap heap—in helping provide some stability in what may otherwise be a turbulent period of two or three years ahead.

3. DEPARTMENT OF ENERGY

We feel like one of the small-business winners in the DOE-sweepstakes. The $1 million or so that they invested in us over the years is a large amount of money for a small company, and was very important to our survival. Last year, in their listing of second-generation (or advance) fluid bed combustor programs that they sponsored, two of the three projects listed were ours.

And yet we feel a little like a minority employee: last hired, first fired. The amount of money going into small companies has been less than 1 percent of the total spent on FBC development, and when their coal-research budget was sliced in half last year, their expressed priorities were 1) to retain the large demonstration programs and, if pressed further, to 2) retain their national laboratory staffs. In short, projects like ours were the first to be cut, advance technology or not.

DOE appears to be an endangered species anyway, but if there is to be a reincarnation under some other agency, I would hope there would be some small-company

set-aside program included in its charter. DOE is clearly uncomfortable with us little companies in these heavy-industrial development programs, but the fact remains two of the three companies with sales success in FBC's are small companies. The company which DOE entrusted with their major industrial development program has now spent over $20 million and still appears to be a year from the marketplace. Small companies are traditionally the most agile in the early-development stage of new products, and fluid bed combustors aren't turning out any different.

So far, FBC's have been applied only to the industrial process-steam sector. The potential uses for FBC's could be extended several-fold by their application to other uses, which I've described in a paper entitled "Coal-combustion Technology: What's Left To Be Done?"

Mr. BEDELL. Mr. Gassman?

Mr. GASSMAN. Thank you, Mr. Chairman.

I am Manny Gassman, president of a company known as Maynard Plastics, located in Salem, Mass., as it happens at the Shetland Industrial Park. I would like to mention that Mr. Ericson has in fact done a super job in helping everybody conserve energy in the whole industrial park.

Chairman Bedell and Congressman Mavroules, I would like to thank you and your staff for inviting me to participate. I will try to make my presentation as brief as possible.

The intent was not to plug the plastics industry, if you will, nor to plug any of the products we produce, but answer the questions and give you some background concerning the integration of plastics and energy conservation.

The plastics industry is an essential one. The role of plastics is so broadly integrated into our economy that there is virtually no product area where plastics do not make a major irreplaceable contribution. For many industries such properties as flexibility and design, strength-to-weight ratio, energy efficiency, and non-conductibility make plastics the material of choice and necessity. Examples of that can be found in the automotive industry, construction, food, electronics, medical field, and building products.

A summary of energy savings from plastics will be presented. The plastics industry uses for its raw material only 1.5 percent of the oil and natural gas consumed in the United States. Our Nation's energy conservation priorities are well served through the use of plastics. Although plastics require energy, petroleum or natural gas as raw materials as well as using energy for heating and processing, their utilization saves as much energy as they consume. Without plastic products, our country's energy consumption would increase substantially.

With the overall objective of determining whether the current uses for plastic resins result in energy conservation or excess use of energy, Franklin Associates, an independent research firm, conducted a study of analyzing energy consumption for plastics compared to energy used in producing equivalent products made from alternative materials. The study examined 82 percent of all plastics produced in the United States in 1978. The use of plastics saves over 1,000 trillion Btu's of energy. Plastic products required less energy than nonplastic products in 9 out of 10 of the 264 markets tested. Examples—polypropylene components for appliances saved 16 trillion Btu's. About 4.1 percent of the total savings in the study were based on calculations on the basis of manufacture and use of the products rather than just a simple materials replacement.

Example. In the case of ABS resin used for automobile parts, just one of the several plastic materials used in today's cars, weight reduction and fuel savings associated with this light weight resulted in total energy savings of 5 trillion Btu's.

I would just like to give you a brief résumé of our company's activities.

Maynard Plastics has been in the plastics extrusion business since 1949. Although we formulate a high percentage of our own material, our company is basically a processor. That is, we convert various raw materials into an O.E.M. finished product.

The extrusion segments of the plastics industry is extremely fragmented. There are probably 800 to 900 plastics extrusion companies of various sizes in the United States. We perceive ours to be one of the leaders in industry in terms of technology and product lines. Some of the typical product diversification applications we have are as follows. In the automobile industry, refrigerator truckbed insulation; electronic industry, integrated circuit packaging. We are also producing furniture products, products for the medical field, luggage industry. One of our key products that we produce for the building products industry are gaskets used for windows and window frames and moldings.

I have here for information in case anyone is interested some samples of those types of products.

The things that small companies can do with respect to the decrease in energy uses—the Society of Plastics Industries of which our company is a member, has had an active program concerning simple and detailed booklets on reducing energy cost. I have a copy here.

Maynard Plastics is one of the larger energy users in our area. In this regard, because of the fuel adjustment charge, our costs have more than tripled over the last 3 years. That is why we are a concerned user of energy and have initiated an energy management program.

Some of the approaches were subtle and simple and others were complex but still worthwhile depending upon the payback. I have an enumeration here of some 12 items. I will try and hit the highlights.

Capacitor installings for power factor control. Analysis of plant lighting. Blowdown fans to recover and recirculate hot air. Analysis of production equipment to lower the base or constant demand factor. Purchase and replacement of energy efficient motor. More energy efficient motors, four pole versus two pole, to effect a 50-percent saving. Use of cooling towers to cool our water—incidentally, we recirculate our own water—as opposed to refrigerated power-driven water. We use smaller individual chill units instead of a central system. We have replaced older type of temperature regulators and controls to use the power more efficiently. There are a host of other things we have done.

I feel that if any small business analyzes their problem, they can probably do the same thing.

Maynard Plastics has contributed to the savings of energy through product design. The extrusion processes and plastic material in general are conducive to the manufacture of products which can ultimately be used by the consumer to save energy. Some of

these we mentioned earlier. We have an active program to develop products for these applications. Some typical applications are weather stripping as used on doors and windows, doorsweep sections, threshold sections, flexible storm window kits, rigid frame members for the application of inexpensive internal and external windows, various products used in the construction of solar panels.

Again, some of these products I have here. I don't want to bore you with them. If you are interested, we will be glad to show them to you.

A few years ago Maynard Plastics developed a primary placement P.V.C. window of unique design which is energy efficient when compared to aluminum. P.V.C. is a superior energy-saving window material when compared to steel or aluminum. The Btu loss per hour of vinyl is 2.3 versus 300 for steel and 1,400 for aluminum. Furthermore, P.V.C. has no rust, rot, et cetera. One measure of a window's effectiveness is called its thermal transmittance, or U value. One of our customers has noted their double-glazed vinyl window's U value was rated at 0.52. A similar double-glazed wood window lost 26 percent more heat, U value 0.66. And a double-glazed metal window lost 60 percent more heat, a U value of 0.83.

There was a recent energy show at the Commonwealth Pier, and there were any number of products that were on display there in which one might save energy. We produced some of those products.

As you can see from my comments in this presentation, we as a company are well acquainted with the need for energy conservation. Ours has been a multifaceted effort. We agree with sensible Government programs such as energy conservation tax credit, et cetera. And notwithstanding the R. & D. tax credit which we know about, perhaps it would make sense to grant tax credits of some kind to manufacturers and developers of such products to encourage work in these fields.

Mr. BEDELL. Thank you very much. We appreciate your testimony, Mr. Gassman.

[Mr. Gassman's prepared statement and attachments follow:]

PREPARED STATEMENT OF MAYNARD GASSMAN, PRESIDENT, MAYNARD PLASTICS CO., SALEM, MASS.

I. PERSONAL BACKGROUND

Manny Gassman, President, Maynard Plastics Company, 49 Congress St., Salem, Mass. 01970.

After receiving my BS degree from MIT in 1949, I connected with a small affiliate of Maynard Plastics.

After spending two years in the service (1952–1954), returned to Maynard Plastics Co. and have been connected with Maynard Plastics up until the present time. I became president in 1970. I am a member of S.P.E. (Society of Plastic Engineers) and S.P.I. (Society of Plastics Industries) and various other pertinent trade organizations.

II. PLASTICS INDUSTRIES' POSITION WITH RESPECT TO ENERGY SAVINGS FROM PLASTICS

Plastic products are essential

The role of plastics is so broadly integrated into our economy that there is virtually no product area where plastics do not make a major, irreplaceable contribution. For many industries, such properties as flexibility in design, strength-to-weight ratio, energy efficiency and non-conductibility make plastics the material of choice or necessity. Examples include:

Automobile Industry: to help meet government miles-per-gallon fuel efficiency requirements; to compete successfully with import cars.

Construction Industry: to replace heavier, more energy-intensive materials for piping, insulation, etc. Among the benefits: savings in fuel for heating.

Food Distribution: to provide lightweight packaging for protection, preservation, and sanitation, enabling the agriculture industry to reduce waste and the costs of processing and distributing its products.

Electronics: to provide insulation and circuitry essential for computers, telephones, television equipment, and the sophisticated communications systems needed for national defense.

Medical Field: for pacemakers, kidney dialysis units, defibrillators (for use in cardiac arrest), prosthetic devices; etc.

Building Products Field.

Summary of energy savings from plastics

The plastics industry uses for its raw materials only 1.5 percent of the oil and natural gas consumed in the United States.

Our nation's energy conservation priories are well served through the use of plastics. Although plastics require energy (petroleum or natural gas) as raw materials, as well as using energy for heating and processing, their utilization saves as much energy as they consume. Without plastics products, our country's energy consumption would increase substantially.

With the overall objective of determining whether the current uses for plastic resins result in energy conservation or excessive use of energy, Franklin Associates, an independent research firm, conducted a study analyzing energy consumption for plastics compared to the energy used in producing equivalent products made from alternative materials. The study examined 82 percent of all plastics produced in the United States in 1978.

The use of plastics saved over 1,000 trillion Btu's of energy. This is equivalent to 180 million barrels of oil or 36 million tons of coal. Plastics showed impressive savings in the use of all fossil fuels.

Plastics products required less energy than non-plastics products in nine out of ten of the 264 markets tested.

Examples.—Polypropylene components for appliances saved 16 trillion Btu's.

High density polyethylene bottles (used for household chemicals, milk and other foodstuffs) saved 29 trillion Btu's.

About 4.1 percent of the total savings in this study were based on calculations on the basis of manufacture and use of the products rather than just a simple materials replacement.

Example.—In the case of ABS resin used for automobile parts (just one of several plastics materials used in today's cars), weight reduction and the fuel savings associated with this light-weighting resulted in a total energy savings of 5 trillion Btu's.

Although not covered in the Franklin Associates study, plastics are, in almost every instance, lighter than products made of alternate materials. Thus, considerable energy savings can be achieved in the transportation of plastics products because of the lower weight involved. This is also true of products packaged in plastics.

III. COMPANY RÉSUMÉ OF ACTIVITIES

Maynard Plastics has been in the plastics extrusion and fabrication business since 1949. Although we formulate a high percentage of our own material, our company is basically a processor; i.e. we convert various raw materials into an O.E.M. finished product. The extrusion segment of the plastics industry is extremely fragmented. There are probably 800–900 plastic extrusion companies of various sizes in the U.S. We perceive ourselves as one of the leaders in the industry in terms of technology and product lines.

Together with our Poly-Tex, Pittsburgh, operation we employ over 300 people, run 24 hours a day 5 to 7 days a week and occupy 270,000 square feet of plant for our plastics activity.

Some of our typical product diversification applications are as follows:

1. Automotive—Refrigerator truck body insulation; Upholstery welt.
2. Electronics and Telephone—Integrated circuit packaging media, protective tubes & sleeves.
3. Furniture—Edge treatments.
4. Building Products Industry—Gaskets for windows, window frames, moldings, etc.
5. Medical Field—Dialysis net, tubings of various types.

6. Luggage Industry—Trim products.
7. Packaging Industry—Polyethylene bags for packaging use.

IV. WHAT SMALL COMPANIES CAN DO TO DECREASE ENERGY USES

The Society of Plastics Industries of which our company is a member has had an active program concerning simple and detailed booklets on reducing energy costs, a copy of which I have here.

Maynard Plastics is one of the larger energy users in our area. In this area, because of the fuel adjustment charge, our costs have more than tripled over the last three years. Last year we used 9.4MM kWh of electrical energy. The actual kWh charge was $252,000. The fuel adjustment costs were $372,000. That is why we are a concerned user of energy and have initiated an "Energy Management" program.

Some of the approaches are subtle and simple, others are more complex but still worthwhile. Some typical approaches for savings are as follows:

1. Capacitor installation for power factor control.
2. Analysis of plant lighting scheme with reduction where appropriate. Install energy efficient tubes.
3. Use of insulation on ceiling windows where appropriate.
4. Blow down fans to recover and recirculate hot air.
5. Analysis of production equipment to lower base or constant demand factor.
6. Purchase and/or replacement of energy efficient motors (4 pole vs. 2 pole) (when this can be done, savings of 50 percent can be achieved).
7. Use of cooling tower vs. refrigerated water where applicable. (We recirculate our water.)
8. Use of smaller, individual chilled water units instead of a large central system.
9. Replacement program of old design temp. regulators and controls on our extruders to prevent overriding and excess use.
10. Time clock shutoff switches on process equipment where applicable.
11. Conversion to latest design of heating bands on equipment.
12. Use of plastic strip curtains in shipping and receiving areas to block drafts, etc.

These are just some of the key ingredients that we've applied. We try to get all personnel involved in energy management just as we do with our safety program.

V. MAYNARD PLASTICS CONTRIBUTION TO SAVING OF ENERGY THROUGH PRODUCT DESIGN

The extrusion process and plastic material in general are conducive to the manufacture of products which can be ultimately used by the consumer to save energy. Some of these products were mentioned previously. We have an active program to develop products for these applications. Some typical applications are:

Weather stripping as used on doors and windows; door sweeps; threshold sections; flexible storm window kits; rigid frame members for the application of inexpensive external and internal storm windows; various products used in the construction of solar panels.

Some of these products are displayed here for your inspection.

A few years ago Maynard Plastics developed a prime replacement P.V.C. window of unique design which is energy efficient when compared to aluminum and has other advantages over regular wooden windows.

P.V.C. is a superior energy saving window material when compared to steel and aluminum. The Btu loss per hour of vinyl is 1.3 versus 300 for steel and 1400 for aluminum. Furthermore, P.V.C. won't rust, rot, and requires much less maintenance than steel, aluminum and wood.

One measure of a window's effectiveness is its thermal transmittance (commonly called U value). One of our customers has noted that their double glazed vinyl window's U value was rated at .52. A similar double glazed wood window lost 26 percent more heat (U value .66) and a double glazed metal window lost 60 percent more heat (U value .83).

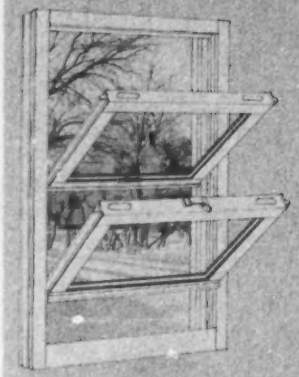
We also had on display through our Poly-Tex division a P.V.C. window at the recent New England Energy Expo which took place October 1, 2, 3, and 4 at the Commonwealth Pier Exhibition Hall. Perhaps some of the other local people who are present today attended this show. It was, of course, directed to the consumer and had on display a large variety of energy saving products.

As you can see from this presentation, we as a company are well acquainted with the need for energy conservation. Ours has been a multifaceted effort.

We agree with sensible government programs such as energy conservation, tax credits, etc. Perhaps it would make sense to grant tax credits of some kind to manufacturers and developers of such products to encourage work in these fields in all areas of industry.

NEITHER WIND
NOR RAIN NOR
COLD OF NIGHT
can penetrate
Custom Gard
insulated replacement
windows.
CUSTOM GARD

Now you can get thermalized, draft-free protection with optimum fuel savings.



Top and bottom sashes open full length top and bottom, tilt in for safe convenient cleaning. Properly balanced to hold windows in any position. Sashes can be replaced and lowered smoothly with little effort. Should glass replacement be necessary, sashes can be removed from the inside.

Keeping the house warm in winter, cool in summer, Custom Gard rigid vinyl replacement windows will prove a long-term investment in comfort and energy savings.

Introducing Maynard Custom Gard M.™ The new generation of Rigid Vinyl Replacement Windows. Advanced technological design makes Custom Gard stronger, more efficient, provides built-in safeguards against weather hazards, and outside noise intrusion.

Thanks to Maynard technology, you can enjoy the year-round comfort offered by rigid vinyl windows test-rated for superior performance under extreme weather conditions.

Maynard, a world leader in precision plastic extrusions for almost 40 years, presents a new generation in the window replacement systems test-rated for superior performance under extreme weather conditions.

Built to the highest standards, Maynard's thermalized Custom Gard systems provide waterproof, windproof, weather-tight insulation while a trim unobstructed profile improves the appearance of the home.

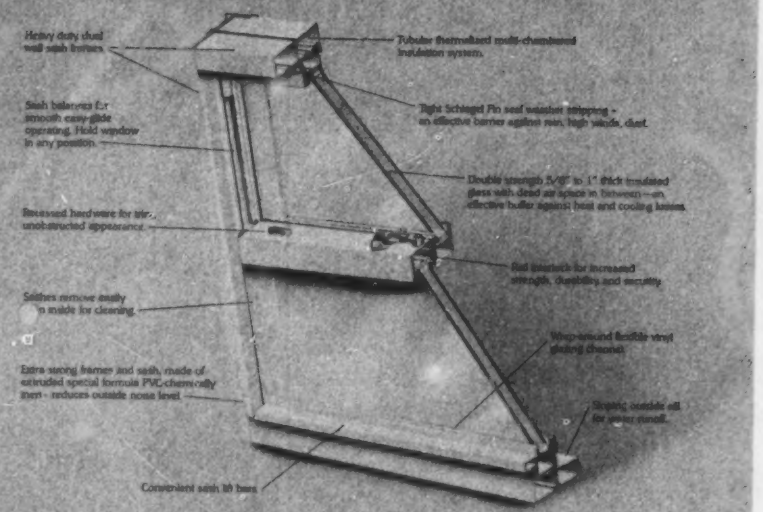
Non-obstructing recessed hardware is one of the many design features that appeal to the discerning homemaker.

Maynard's Custom Gard windows were developed after an exhaustive study of the needs of the marketplace. This included a review of all other systems now available including vinyl, aluminum, wood, and combinations of these materials.

The strength, stability and insulating properties of rigid vinyl (PVC) were found to provide the most effective barrier against heat loss and condensation while eliminating maintenance problems. Window replacement systems made from wood and aluminum proved deficient by comparison and more costly in the long run.

The development of Maynard Custom Gard Systems, headed by a team of experts in replacement windows and PVC extrusions, carries at an opportune time. Homemakers and others confronted by rising fuel costs can now enjoy year-round savings on heating-cooling bills.

Besides having a long-term investment in comfort and economy, Maynard Custom Gard windows add to the value of the property. Maintenance headaches are virtually eliminated. No painting or puttying will ever be required. Also quieter, they help filter out noise.


Heavy duty steel weil-sash frames
Tubular thermalized multi-chambered insulation system.
Sash balances for smooth easy-glide operating. Hold window in any position
Tight Schlegel Fin seal weather stripping - an effective barrier against rain, high winds, dust.
Double strength 3/16" to 1" thick insulated glass with dead air space in between—an effective buffer against heat and cooling losses.
Recessed hardware for unobstructed appearance
Rail interlock for increased strength, durability and security.
Sashes remove easily from inside for cleaning.
Wrap-around flexible vinyl glazing channel
Extra strong frames and sash, made of extruded special formula PVC chemically fused - reduces outside noise level.
Sloping outside sill for water runoff.
Convenient sash lift bars

To achieve maximum fuel economy, Maynard engineers pioneered a new multi-chambered, weathertight, thermal-seal insulating system incorporating Schlegel, bi-metal wool pile weather stripping features. Each chamber in this highly integrated system serves as an air pocket to inhibit temperature fluctuations.

Custom Gard windows are double glazed with hermetically sealed insulating glass. Dead air space in between helps create an effective buffer against heat and cooling losses, while reducing outside noise transmission. (Triple glazed windows are also available as an option).

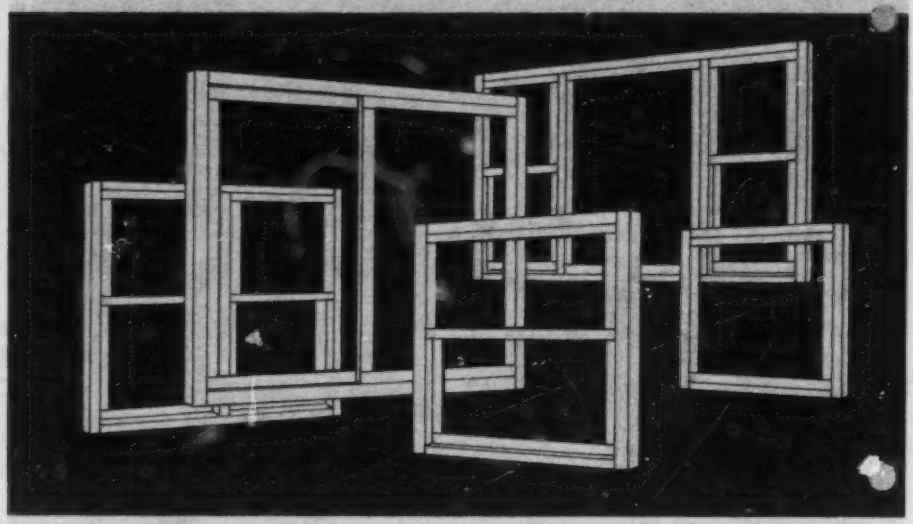
Because each extruded part of Custom Gard windows has to be precisely calibrated to dimension, Maynard's long expertise in plastic extrusions has come into full play. Absolute uniformity vital to proper functioning has been achieved, safeguarded through rigid inspection and quality control.

Maynard Custom Gard replacement windows are available only through selected authorized window manufacturers who are trained by factory technicians to maintain Maynard's rigid quality standards that assure lasting satisfaction.

Thermal Insulating Custom Gard Replacement Windows Make Upkeep a Snap.

- Virtually maintenance-free, a major improvement in window design
- Each window is custom-fitted, quickly installed from inside the house without structural alterations
- Triple glazing optional
- No painting or puttying ever. Won't discolor. Solid white throughout
- Unaffected by salt air or pollutants
- Won't rot, warp, swell or crack like wood
- Won't rust, corrode, or pit like metal
- Clean easily with detergent and water from inside the house
- Decorative grilles available sealed between layers of glass
- Quick, easy glass replacement
- Optional screens can be installed and removed from inside
- No need for storm windows
- Tax credit allowed for energy-saving windows when used to replace inefficient windows

Maynard Custom Gard Windows adapt to many architectural styles. Windows are custom fitted to any opening.



Test-Rated for Superior Performance in Heat Retention and Condensation Resistance.

The National Certified Testing Laboratories have measured the heat flow of air from the inside to the outside of Custom Gard insulated windows and have given them a U_C Rating of .55 BTU per HR • FT² • F. This compares with U_C Ratings exceeding 1.00 in comparable tests of wood and metal windows without insulated glass, indicating that Custom Gard is approximately twice as effective in reducing heat loss.

The NCTL also reported a Condensation Resistance Factor (CRF) of 55, indicating Custom Gard provides effective insulation against temperature fluctuations and condensation.

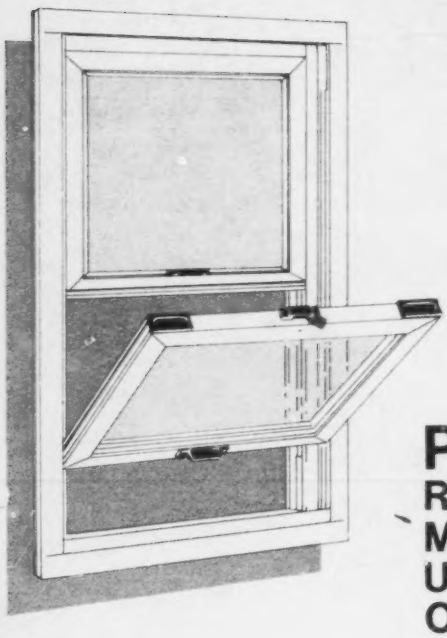
A study by the University of Illinois shows that savings of 16% to 59% can be made by updating older single-glazed windows. In just one heating season, a house with 20 windows (3'4" x 4'6"), with just single pane glass and no weatherstripping can lose heat through the windows equivalent to 700 gallons of oil, 860 therms of gas, or 20,000 kwh of electricity.

Updating windows may be almost as important as insulating an attic in terms of energy savings.

The Department of Energy estimates that 90 per cent of the homes in the U.S. are still energy wasters, and that 30 per cent or more of that wasted energy is due to poor windows.

CUSTOM GARD™

Maynard Plastics, Inc. Salem, Mass. 01970
Subsidiary of Chelsea Industries, Inc.



Poly-Tex Company
300-B North Braddock Avenue
Pittsburgh, PA 15208
Subsidiary of Chelsea Industries, Inc.

POLY-TEX

RIGID VINYL REPLACEMENT WINDOWS OPEN UP VAST NEW PROFIT OPPORTUNITIES.

If you manufacture aluminum replacement and/or storm windows now, you'll find it easy to get started in a related field that offers you unlimited growth.

If you're not yet in the window fabricating business, but would like to get into it, we can show you how a modest investment in equipment and inventory can mark the beginning of a bright future in a growing and very profitable industry. Your investment should pay for itself in a short period of time.

The market is ready and waiting for you, right now. You don't have to depend on the housing industry to improve. You don't have to be concerned over high interest rates. The stakes are large, and the demand for rigid vinyl replacement windows was never better.

Poly-Tex introduced the first tilt all-vinyl double hung window in the industry in 1975 and has been the standard for all other vinyl windows that have followed.

One of the largest rigid profile extruders in the country, Poly-Tex is a subsidiary of Chelsea Industries, Inc., a public company with annual sales over $250,000,000.

We supply to fabricators PVC lineals for a double hung, slider, and picture window. They in turn sell direct to retail consumers or manufacture windows to order for wholesalers who sell and install the finished products in homes.

> Only 4 basic extrusions are required for the Poly-Tex double hung window, and 2 additional shapes for a slider and picture window. Each window is custom-fitted, readily installed from inside the house without structural alterations.

We help all fabricators of Poly-Tex windows every step of the way, supplying all backup information and advising on sources for components such as hardware, weatherstripping, etc. We also provide a complete, debugged tooling package.

> Poly-Tex windows represent the newest development in this fast-growing industry. Designed and engineered by specialists in window technology, they have greater durability and weather-resistance than wood and metal windows.

Their U rating, or BTU loss, is just .51, compared to 1.00 and over for wood and metal windows without insulated glass. Their CRF rating (Condensation Resistance Factor) has an ETL rating of 58, which makes Poly-Tex windows virtually condensation free.

Poly-Tex windows maximize fuel efficiency while minimizing condensation and noise intrusion.

The heart of the window is a multi-chambered, weather-tight thermalized system that incorporates the highly recommended Schlegel fin-seal wool pile weatherstripping.

Each chamber in this fully integrated system serves as an air pocket to inhibit temperature fluctuations.

> Poly-Tex windows can be single glazed or double and triple glazed with hermetically sealed insulating glass. Dead air space in between the glass helps create an effective buffer against heating and cooling losses, while reducing outside noise transmission.

Dual Durometer Sash, which eliminates the need for wrap around (marine) glazing, will be available in Spring 1981.

Poly-Tex windows will never require painting. Solid white throughout, they won't discolor. They won't rot, warp, swell or crack like wood; won't rust, corrode, or pit like metal.

Sashes tilt in for safe, easy cleaning or replacement from the inside.

Poly-Tex's notched (square cut) master frame is 15% to 20% heavier than competitive shapes.

We are currently in the process of experimenting with aluminum reinforcing in our sash which will provide an A-2 approved window for commercial use. This should be available mid-1981.

A bronze rigid PVC is currently under test and should be available as a certified and weather-tested material by mid-1981.

Prime Fin adapter is available for use in new construction.

A sloping sill permits water runoff.

Many other features clearly prove Poly-Tex's top-ranking position in this enormous market.

> An independent building industry research group estimates that approximately 12 million replacement windows were sold in 1979. The total cost for these windows is estimated over a billion dollars.

You can readily see the enormous sales potential offered by replacement windows.

In fact, updating windows may be almost as important as insulating an attic in terms of energy savings. The Department of Energy

estimates that 90 per cent of the homes in the U.S. are still energy wasters, and that 30 per cent of that wasted energy is due to poor windows.

The United States Government also allows a tax credit of 15 per cent on expenditures up to $2000 for energy saving windows.

> Seldom in modern times has such an opportunity come along that matches the tremendous potential of replacement windows. Now's the time to get started.

Call (412) 241-8934, and we'll be glad to show you our products, give you demonstrations, talk facts and figures, explain just how your particular operation can participate to best advantage in the vast, fast-growing window replacement market. No obligation on your part, of course.

Or write:

Poly-Tex Company
300-B North Braddock Avenue
Pittsburgh, PA 15208
Subsidiary of Chelsea Industries, Inc.

P. S. Poly-Tex is planning to introduce a complete storm window program by December 1981, consisting of a triple track double hung, slider, and picture window. More profits for you.

Mr. BEDELL. Mr. Mavroules.

Mr. MAVROULES. Mr. Chairman, I am not going to ask any questions. I do have a couple of comments, however.

I want you to know Mr. Molin is the chairman of my small business task force we put together here. It is probably the first one of its kind in the country.

Mr. Wormser does great energy work. We were able to assist him with a Federal grant a couple of years ago. He has done very well with that. And of course, Manny has been around quite a while.

I think what I am getting from you this morning, gentlemen is good vibes that all you want is an opportunity to be given a fair chance to survive.

We cannot refer to the State level of government. But I want to assure you that on the Federal level, in the small business meetings we do have in our subcommittee, all initiatives are toward finding ways to assist small businesses throughout the country. I think they have done a fairly good job over the years. Attitude, of course, can destroy that. I just want to reassure you that the attitude right now in Washington is very positive.

Let me ask a few questions.

In the new tax package as agreed to by the Congress, we have an accelerated depreciation, capital cost recovery. How will that affect you? Will that improve your cash flow to some degree? Will you be able to reimburse some of these funds into your energy related matters, or perhaps into your businesses as a whole?

Mr. MOLIN. The accelerated depreciation particularly is going to help me quite a bit. The technical advances in equipment of course are going rather rapidly. Just a few weeks ago, a couple of months ago I bought a $120,000 piece of EDM equipment. They tell me over in Japan now they have equipment that is a lot more sophisticated than what I have. Some of my competitors are looking at this. It is something I have to constantly look to upgrade in order to remain competitive. And this will help.

Mr. WORMSER. Certainly it is a help to our customers that they are able to depreciate our equipment in 10 years. Previously it had been 21 years.

Mr. GASSMAN. From our point of view it will certainly assist us because we are interested in payback. It just gives us added incentive to invest in programs like this, putting in more equipment, et cetera. We are worried about the high interest rates in terms of the impact on our customers, in terms of buying the products. That is what we are worried about.

Mr. MAVROULES. We are worried about that, too. That is a No. 1 priority in the Congress right now. If you heard the President's remarks yesterday, that he felt we are now in a slight recession at this point. Mr. Stockman stated this morning they saw it coming for 2 years. I will take the President's remarks that we are having a very difficult time, a tight money market. We are trying to assist the President in his policies, although I disagree in many areas about where he is coming from. But that is a national problem. We are trying to work at it.

Mr. BEDELL. Thank you, Mr. Mavroules.

I hate to disagree with my colleague, but my assessment would be that the Congress has this concern for small business. But I

have to tell you, in all candor, I do not necessarily see it in all areas of the administration—as you have indicated quite clearly, Mr. Wormser. For example in the Energy Department, the first thing cut was the support for small business energy research and development. And it just breaks my heart to see the way they are still pouring money into the nuclear program in increasing amounts and at the same time they are cutting off efforts such as you have been involved in, and a great many others in this area, by the way.

So, I have to respectfully disagree. I think there is a concern for small business on the part of the Congress. I don't see it in the administration. I just have to be that blunt. Maybe I should not say that. This is a nonpartisan hearing, but what I see breaks my heart.

Mr. MAVROULES. I was referring to our Small Business Committee, Mr. Chairman. I certainly don't agree with many things the administration is doing.

Mr. BEDELL. I am extremely interested in your testimony here, Mr. Wormser, because it is new knowledge for me. In your fluidized-bed systems, can you burn high sulfur coal without the problem of the sulfur dioxide effluents, or does that not help with those problems?

Mr. WORMSER. That is a key concept. You add a limestone sand to the combustion bed and that removes the sulfur dioxide fumes from any grade of coal.

Mr. BEDELL. You can burn high sulfur coal?

Mr. WORMSER. Yes.

Mr. BEDELL. What sort of investment is it to install your equipment in a school building or a commercial building?

Mr. WORMSER. Well, it depends a good deal on the size. Our smallest equipment is on the order of a $500,000 coal-fired boiler.

Mr. BEDELL. Investment?

Mr. WORMSER. Right.

Mr. BEDELL. That is a conversion cost?

Mr. WORMSER. This is a conversion cost, right.

Mr. BEDELL. The reason I ask is we have a lot of high sulfur coal in Iowa. Is it possible that we could put a fluidized-bed system in—is that coming into the future here, where we could use that coal?

Mr. WORMSER. I think Iowa is cursed with some of the highest sulfur coal in the country. It is something we are going to be actively pursuing and expect to see quite a lot of effort coming into that.

Mr. BEDELL. How close are we to where you could burn that coal in a fluidized-bed process economically and not have a problem with the effluents?

Mr. WORMSER. We have had a unit installed at a local factory for 3 years. Our first full-scale unit is going to be installed in a plant in Amarillo, Tex., this coming summer. We are really at the commercial stage now. We are building up as a company to be able to supply this equipment to whomever would like to buy it.

Mr. BEDELL. How big is your company?

Mr. WORMSER. At the present time we are about 15 people.

Mr. BEDELL. I guess the next question that comes to mind is, Are there quite a number of fluidized-bed producing companies similar to yours?

Mr. WORMSER. There is one other small company which is a 100-year-old boiler company that has converted to this. It has sales of about $10 million. And the third company is Foster Wheeler, which built a fluid bed combustion in Georgetown, that has also been sold commercially. So there are three of us altogether with commercial sales.

Mr. BEDELL. My question is, if that is commercially feasible, economic, you would be talking about—I should think—a multibillion-dollar industry. Where are you going to be when that happens?

Mr. WORMSER. We hope we will be there. We are certainly planning, as far as our own equipment is concerned, to be growing significantly quickly enough to be able to keep a market share so we will be able to service the customer. We realize it is a very large potential market. We are planning to stay with it.

Mr. BEDELL. Quite exciting.

Mr. WORMSER. Thank you.

Mr. BEDELL. We appreciate very much your testimony.

Our next witness is Ed Blakelock, Massachusetts Eastern Chapter, National Home Improvement Council.

Mr. BLAKELOCK. Mr. Chairman, I request to be excused. The gentleman who was to speak to you has not arrived from California. I am not qualified to talk about that.

Mr. BEDELL. We will pass by your testimony. If we get through in time and he arrives, we will return to you. Thank you very much.[1]

Our next witnesses are Mr. Bob Mitchell, Northeast Solar Energy Center, Boston, Mass., and Mr. William Curry, Plumbing-Heating-Cooling Contractors of Massachusetts, of Lowell, Mass.

TESTIMONY OF ROBERT W. MITCHELL, MANAGER, INDUSTRIAL LIAISON, NORTHERN ENERGY CORP., AND NORTHEAST SOLAR ENERGY CENTER, BOSTON, MASS.; AND WILLIAM CURRY, PLUMBING-HEATING-COOLING CONTRACTORS OF MASSACHUSETTS, LOWELL, MASS.

Mr. MITCHELL. Mr. Chairman, honorable members of the panel. I will try to condense my 10-minute remarks into something less than 10 minutes.

Mr. BEDELL. We would appreciate that.

Mr. MITCHELL. I would like to introduce our company that is not as yet well known. It is the Northern Energy Corp. We are under contract with the Department of Energy to manage and operate the Northeast Solar Energy Center. I think you are aware that the Center's future is in question at this particular time.

The Northern Energy Corp. is a not-for-profit company dedicated to the industrialization of renewable energy technologies, energy management services and innovative financing.

I would like to emphasize some of the comments made earlier. New England is a sizable energy market and has an average demand of the equivalent of 1.7 million barrels of oil daily. Of this

[1] See app. C, statement of National Home Improvement Council, Inc.

demand 75 percent is satisfied by oil and over 80 percent of this oil is imported. That means two-thirds of our total energy requirements are coming from insecure foreign sources. And Massachusetts is even more dependent, almost at the level of three-quarters dependence upon foreign sources.

I would like to update also some of the data that Congressman Mavroules presented. The energy cost differential, since the 1979–80 oil price shocks has gone from 26-percent premium that New England pays over and above the U.S. average, to almost 40 percent. So our—New England's—situation is even worse than what was presented in the opening remarks.

I would like also, for the record, to compare some of the costs of usable heat per million Btu's in New England; and these do extend nationwide in most cases.

Electricity is the most expensive energy New England utilizes, almost $22 per million Btu's. Oil is next, No. 2 heating oil is $15.60 per million Btu's. Followed by firewood and natural gas, and next wood chips, which are about $5 per million Btu's. And of course solar, the energy technologies we are endeavoring to accelerate industrialization is zero dollars per million BTU's. Of course the avoided use of energy conservation—looking at the first cost of this avoided use can be anywhere from zero to $8 per million Btu's, depending upon the level of investment made.

When I say "solar" I am talking about all renewable energy sources. Solar and conservation are still the principle areas in which small businesses as well as large businesses should concentrate their intermediate long-term efforts—investments—and deliberately derive short-term payouts.

Solar radiation is free. The sun will continue to radiate light and energy on us whether we use it or not. It is also interesting to compare the "Solar Index's" of a few cities in New England with cities external to the region. The "Solar Index" incidentally considers the radiation available for conversion to energy by domestic solar hot water systems designed for specific locations. I think you will find these comparisons very interesting.

The "Solar Index" in Boston compares with the "Index" in San Diego, Calif.; Concord, N.H., with Montgomery, Ala.; Burlington, Vt., with Los Angeles; and Providence, R.I., with Tampa, Fla. This means, on an annual average, each of the two cities compared receive a roughly equal amount—percentage—of usable solar energy that could be converted to heat energy and adequately heat 80 gallons of water daily—displacing the same percentage of conventional energy need.

The small businessman not only in Massachusetts but also in the entire Nation, is in an untenable position. To put it another way, he is between an "energy cost rock" and an "interest hard place". Energy cost savings opportunities are available in the form of tax credits, less expensive fuel sources, and low to intermediate cost conservation actions. In most cases, the small businessman doesn't take advantage of these opportunities. First, he doesn't know about them. Second, he hasn't the time or the staff to consider them. And equally important, he cannot afford the cost of money required to take the identified actions that could have a return on investment of less than 12 months.

A number of trade associations have developed energy conservation recommendations for their members, assisted members in expanding their business base, assisted in diverting some of the members' marketing technology into other energy systems and are giving continued assistance in the form of periodic energy bulletins.

A recent Northern Energy Corp. study entitled "Judgmental Estimate of the Renewable Energy Employment Opportunities Through 2000"—embracing almost totally small businesses—concluded that expanded use of renewable energy resources could, if allowed to compete equitably with the so-called conventional forms of energy, generate by 1985 as many as 34,000 new jobs in New England, reduce the need of importing oil by an increment of 73,000 barrels a day, and give an added stimulus to the regions economy of over $3.7 billion additional gross regional product during 1985. A copy of this study is included in the attachments to my paper.

In reviewing a variety of solar disciplines and the number of small businesses that have operated in that field, some very impressive numbers emerged. Looking at the groupings of "Builders building passive solar homes and retrofit additions," "Designers of buildings for sunspace and solar greenhouses," and "solar contractors" that are knowledgeable and experienced in domestic solar hot water heating systems, we now have in excess of 800 small businesses in New England, of which 210 are in Massachusetts.

Part of the solution to the energy dilemma is innovative financing. During the third quarter of fiscal year 1981, DOE rescinded a substantial portion of the NESEC budget. Prior to this action, DOE had precluded us (NEC) from taking any actions in the marketplace that were not part in parcel of the NESEC work plan with the Department of Energy. DOE lifted this restriction. Now we are free to work independently with both the private and public sectors except in those few R. & D. related work items negotiated specifically with DOE, yet to be determined as far as fiscal year 1982 is concerned.) In the context of small business, we recently advised the Smaller Business Association of New England of a program that might well be of interest to members that do not have energy costs under control. Very briefly the program embraces five distinct areas:

One, establishing an energy use baseline for the facility.

Two, establishing specific process energy balances.

Three, developing and implementing a no or low cost training program for staff motivation.

Four, formulating technical recommendations.

Five, implementing recommendations selected by facility management.

In this last step, we are willing to work with the client to identify financing for the project or projects that facility management may have chosen as a result of the energy survey and analysis, prepare the necessary memoranda for presentation to investors and insure the client obtains the most favorable terms available or, under conditions mutually acceptable to the client, we might wish to participate as a partner in the implementation of the program. In any event, the financial burden on the client can be minimized,

his project can go forward, he would have assurances of performance and, most importantly, energy cost savings and the bending down of the energy cost trendline flow to the client's bottom line.

The introduction of new concepts takes time in acceptance and time for the early projects to be brought to fruition. The majority of small businessmen will rely upon the successful experience of their peers before taking the plunge themselves. Hopefully the small business community in eastern Massachusetts, in the Commonwealth generally, in New England and in the Nation will, in a reasonably short period of time recognize the business opportunities available in the form of innovative financial arrangements and will give early consideration to possible corrective actions. The tax credits passed in 1978 and those recently instituted are absolutely essential to the small business community regaining its vitality and viability.

Thank you.

Mr. BEDELL. Thank you very much, Mr. Mitchell.

[Mr. Mitchell's prepared statement and attachments follow:]

PREPARED STATEMENT OF ROBERT W. MITCHELL, MANAGER, INDUSTRIAL LIAISON, NORTHERN ENERGY CORP., NORTHEAST SOLAR ENERGY CENTER, BOSTON, MASS.

Mr. Chairman and Honorable Members of the House of Representatives Small Business Subcommittee on Energy, Environment and Safety. My name is Bob Mitchell. I am the manager of the Office of Industrial Liaison of the Northern Energy Corporation (NEC). NEC is a not-for-profit organization dedicated to the industrialization of renewable energy technologies. Its activities include technology assessment and transfer, market analysis and development, architectural and engineering services, training, information and education. Since 1977, NEC has operated the Northeast Solar Energy Center, the U.S. Department of Energy's lead agent for alternative energy commercialization throughout the nine-state northeast region: New England, New York, New Jersey, and Pennsylvania.

New England is a sizeable energy market with an average daily demand of the equivalent of 1,700,000 barrels of oil (att. 1). 73 percent of this demand is satisfied by oil and 87 percent of this oil is imported. This amounts to two-thirds of New England's energy demand being dependent on insecure foreign sources; for Massachusetts this foreign dependence is about 72 percent. At today's costs this is a daily debit to the economy of New England of over $35,000,000; to Massachusetts, $17,000,000. This is a debilitating continuing drain on New England's economy; a weakening condition from which it will take New England many years to extricate itself and to regain its competitive posture.

In 1970 an average unit of energy (one million BTU's) cost New Englanders $1.79 (att. 2), which was .39 cents or 27.7 percent higher than the U.S. average; in 1980 that same unit of energy cost the New Englander $8.71, $2.30 or 35.9 percent higher than the U.S. average. New England's unit energy cost differential of $2.30 (per million BTU) in 1980 is higher than the total unit cost of $1.79 in 1970. New England uses too much of the most expensive energy type available and, at the same time, has the highest degree of supply insecurity.

At today's costs the usable heat per million BTU's purchased are No. 2 heating oil, $15.60 (att. 3); electricity, $21.95; firewood, $8.88; wood chips, $4.95; solar, $0.00; avoided use, $0.00 to say, $8.00, first time only.

I hasten to add that solar radiation is still free. Solar will continue to radiate on us whether we use it or not. Speaking of solar radiation, it is interesting to compare the Solar Index of a few cities in New England with cities external to the region (att. 4). This index considers radiation available for conversion to energy by domestic solar hot water systems designed for specific locations. Boston compares with San Diego, CA.; Concord, NH with Montgomery, AL.; Burlington, VT. with Los Angeles, CA.; Providence, RI. with Tampa, FL. This means, on an annual average, each of the two cities compared receive a roughly equal percentage of usable solar energy that could be converted to heat 80 gallon units of hot water daily.

The small businessman is in an untenable position. Putting it another way, he is between an "energy" rock/and in "interest" hard place. Energy-cost saving opportunities are available in the form of tax credits, (both federal and state), less expensive

fuel sources (costing less than oil or electricity) and low/and intermediate cost conservation actions. In most cases the businessman doesn't take advantage of these opportunities because first, he doesn't know about or does not recognize the opportunities; second, he hasn't the time to consider them, he doesn't have the staff to dedicate to identifying solutions and, last, and equally important, he can't afford the cost of money required to take actions in areas of conservation, renewable energy resources, change of energy mix or energy management that have an ROI of less than 12 months, and/or less than 18 months. Most businessmen cannot see the logic of taking the time to attend workshops on improving their energy management techniques; they would rather devote the time to keeping their heads above water in continuing the day-to-day operation of their businesses.

A number of trade associations have developed, with the assistance of the Department of Energy, energy conservation recommendations for their members; assisted members in expanding their business base (Northeast Retail Lumberman's Association, NRLA); assisted in diverting some of the members marketing technology into other energy systems (oil distributors getting in the solar business) and giving continued assistance in the form of periodic energy bulletins.

A recent NEC study entitled "Judgmental Estimate of Renewable Energy Employment (Small Business) Opportunities Thru 2000" (att. 5) concluded that the expanded use of renewable energy resources, if allowed to compete equitably with the so-called conventional forms of energy, could generate by 1985 as many as 34,000 new jobs in New England, reduce the need of importing oil by an increment of 73,000 barrels a day and give added stimulus to the region's economy of over $3.7 billion additional gross regional product during 1985.

In reviewing a variety of solar disciplines and the number of small businesses that are operating in this field, some very impressive numbers emerged such as:

	Number of companies	
	New England	Massachusetts
Builders of passive solar homes and retrofit additions (att. 6)	53	14
Designers and builders for sunspace and solar greenhouses (att. 7)	152	45
Designers with passive solar experience (att. 8)	216	67
Solar contractors (domestic solar hot water heating systems) (att. 9)	376	85
Total	800	210

The interest of these companies and their dedication to solar is reassuring. The existing federal and state income tax credits are the essential ingredients in their marketing solar concepts and systems to potential clients. From a client's prospective however, the cost of money is a deterrent. Thus we have a stand off condition—consumers are interested in improving their energy management and costs with conservation and renewable energy resources; suppliers with knowledge and proven technologies are ready to market; but the majority of potential contracts are not being consummated because of the high interest rates/high cost of money.

Part of the answer to this dilemma is innovative financing. (As a preface to my following remarks, during the third quarter of fiscal year 1981 DOE rescinded a substantial portion of the NESEC budget. Prior to this action, DOE had precluded us (NEC) from taking any actions in the marketplace that were not part in parcel of the NESEC work plan wih the Department of Energy. DOE lifted this restriction. Now we are free to work independently with both the private and public sectors except in those few R and D related work items negotiated specifically with DOE, yet to be determined as far as fiscal year 1982 is concerned.) In the context of small business, we recently advised the Smaller Business Association of New England of a program that might well be of interest to members that do not have energy costs under control. Very briefly the program embraces five distinct areas:

1. Establishing an Energy Use Baseline for the Facility;
2. Establishing Specific Process Energy Balances;
3. Developing and Implementing a No/Low Cost Training Program for Staff Motivation;
4. Formulating Technical Recommendations; and
5. Implementing Recommedations Selected by Facility Management.

In this last step, we are willing to work with the client to identify financing for the project or projects that facility management has chosen as a result of the energy survey and analysis, prepare the necessary memoranda for presentation to investors

and insure the client obtains the most favorable terms available or, under conditions mutually acceptable to the client, we might wish to participate as a partner in the implementation of the program. In any event, the financial burden on the client can be minimized, his project can go for forward, he would have assurances of performance and, most importantly, energy cost savings and the "bending down" of the energy cost trendline will flow to the client's "bottom line."

The introduction of new concepts takes time in acceptance and time for the early projects to be brought to fruition. The majority of small businessmen will rely upon the successful experience of their peers before taking the plunge themselves. Hopefully the small business community in Eastern Massachusetts, in the Commonwealth generally, in New England and in the nation will, in a reasonably short period of time recognize the business opportunities available in the form of innovative financial arrangements and will give early consideration to possible corrective actions. The tax credits passed in 1978 and those recently instituted are absolutely essential to the small business community regaining its vitality and viability.

[NOTE: See appendix C for additional material submitted by Mr. Mitchell.]

BUILDERS OF PASSIVE SOLAR HOMES AND RETROFIT ADDITIONS

CONNECTICUT

LeRoy R. Clark, The George C. Field Co., P.O. Box 175—Colton Road, East Lyme, CT 06333, 203-739-9208.

Dennis Davey, Dennis Davey, Inc., 13 South River Road, West Willington, CT 06279, 203-875-1426.

Forbes Morse, Design Associates, Washington, CT 06793, 203-868-2900.

MAINE

Gary L. Colburn, Gary L. Colburn Solar Design & Construction, Insulated Glass Sales, 345 Raymond Hill Road, East Raymond, ME 04071, 207-655-7191.

Harvey R. Lorber, Sol-Air Design, RFD 1, Sylvandale, Etna, ME 04434, 207-269-3571.

Jonathan Gorham, Homesworth Corporation, 18 Maine Street, Yarmouth, ME 04096, 207-846-9934.

MASSACHUSETTS

Neil P. Andersen, President, Plantse Corporation, 264 Pinecrest Beach Drive, Falmouth, MA 02536, 617-540-5372.

Donald & Mollie Bourgeois-Moran, Architectural Designers & Builders, 263 Summer Street, Suite 204, Boston, MA 02210, 617-451-5122.

Norman Coppola/Gary Ijams, The Seasons Construction Company, One Megonko Road, Natick, MA 01760, 617-653-4612.

Merrill Cramer, Solar Yankee, 24 Pine Circle, Pembroke, MA 02359, 617-293-5911.

George H. Falk, Passive Solar Applications, 43 Warren Street, Boylston, MA 01501, 617-869-2452.

Wesley Garner, Snug-a-Bug Solar Homes, Isaac Bradway Road, Hampden, MA 01036, 413-566-3960.

Thomas Lane, Alternative Strategies, Eastern Point, Gloucester, MA 01930, 617-283-0750.

Robert A. McLellan, Stoughton Architectural Systems, 20 Old Maple Street, Stoughton MA, 617-344-9268.

Gerry Magid, Corona Construction, 51 Custer Street, Boston, MA 02130, 617-522-4046.

Larry McNeil, Sun Harvest Eng. Co., 25 Gould Street, Wakefield, MA 01880, 617-246-1789.

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NEW HAMPSHIRE

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Mr. BEDELL. Mr. Curry.

Mr. CURRY. Good morning.

I am Bill Curry. I am representing the Plumbing-Heating-Cooling Contractors Association in this State. We are an organization of small businessmen who are helpfully involved in energy conservation. Our members primarily deal with other small businesses and small energy users such as homeowners, small institutions.

I would like to make a point that it is important when you are talking about small businesses, especially from our standpoint, that homeowners become an integral part of that, because we depend upon the sales to homeowners and what they do in energy conservation for our businesses.

As far as energy conservation is concerned, we deal mostly in building comfort systems, which would be heating, cooling, and also water conservation. The company I work for in the last 2 years has installed over 100 solar home installations, all for domestic hot water. Most of these have been in affluent neighborhoods. I would say generally homeowners above the median income. The homeowners with lesser incomes usually are not in a position to make the financial investment required for the solar installations.

I would like to make a point, although the tax credits do make it less expensive to install energy saving conservation programs such as solar, I don't believe that most people would have actually made the conversion if it were not for the tax credit.

The point is, that it is not a case of people just taking advantage of the tax credits to make it cheaper for something they were going to do all along. I don't believe they would have done it if they didn't have the tax-credit incentive in the first place.

I believe modifications to the tax-credit law such as higher credits for lower tax bracketed incomes, and the availability of low-interest loans to lower income families would enable those people to take part in energy conservation programs.

I feel that another problem is education. I think a grassroots program of educating primarily the lower income people is necessary. Probably a well publicized campaign, for example, a national energy conservation week, where the Government works with the utilities and manufacturers of energy conservation products explaining what is available and how to apply it, and how the average person can figure the cost effectiveness of installing these products in his home. I think when that is done, you would see a widespread acceptance of energy efficient ideas being implemented into the home.

Just briefly, I want to touch on why I don't think large business users need this assistance that the small business users need.

Although they do have the same basic requirements in building comfort systems, the main energy consumption of most of these are used in the process of manufacturing. Because of this, they have great opportunities available to them to implement energy efficient ideas in their plants. Most large users have internal personnel who can institute energy efficiency changes. They are being besieged by energy experts, promoters—our own company, for example, we always go into potential large consumers and will perform energy audits for nothing in hopes of getting some of the work, performing energy conversions. We don't do that in a normal home. It isn't feasible at this point, from a cost standpoint, for us.

Besides people like ourselves, the telephone company now has a major promotion going aimed at large users for automation of control systems via telephone computer service. We have no problem usually selling modifications in large plants. We are doing one right now where we are taking the waste heat from their processes and using that to heat 75 percent of their facility.

So the point I am trying to arrive at, as far as large users are concerned, is that they don't need any Government assistance to promote energy efficient changes in their industry. There are enough internal reasons for them to do it without any outside assistance from the Government.

In closing, I would like to say that the emphasis on energy has to be on the small business and homeowners. They are the people who need the assistance and education which I think is most important, and financial help where applicable.

Thank you.

Mr. BEDELL. Thank you very much. Mr. Mavroules.

Mr. MAVROULES. Thank you, Mr. Chairman.

I want to go back to Mr. Mitchell's testimony. Bob, on page 3, in the second-to-last paragraph, you refer to the NEC study. Do you have a copy of that that you can make part of the record?

Mr. MITCHELL. Yes. I sent a number of different papers to Mr. Tillis. I think there are six different attachments to my paper. The study is attachment 5 of my prepared statement.

Mr. MAVROULES. Then I will make sure we have that as part of the record, Mr. Chairman. I think it is extremely important.

Just one other question. You referred on page 4, in the last paragraph, that part of the answer is innovative financing. I agree with you. Could you, perhaps for the record, articulate your position, not today, but in a normal response to the committee?

Mr. MITCHELL. Yes, sir.

Mr. MAVROULES. And perhaps cite examples.

[See app. C.]

Mr. MAVROULES. I just want to make one brief remark relative to big business versus small business. Although I can only speak for myself—I take a great interest in big business because we have to keep them working also. Down the street a couple of miles from here, a large company initiated their own conservation measures. Within 18 months they were able to save about 22 percent of their oil costs. And since that time, they have improved. I think what we have to do as a country—because of their initiatives, we should not take anything away from them. I know we are here today in a small business meeting, trying to do all we can to assist the small businessmen stay alive and improve their businesses. But I also feel we have to give consideration to big business also, to keep them innovative, and to keep people working.

Mr. CURRY. Well, if they did have a payback, usually that is how we are able to sell them—the payback is so great on energy savings that they don't need any other incentive but that.

Mr. MAVROULES. Thank you. Thank you, Mr. Chairman.

Mr. BEDELL. Thank you.

Mr. Mitchell, as I understand it, a lot of the effort that you have been involved in is going to be cut back if not eliminated, is that correct?

Mr. MITCHELL. Yes, sir. In fact, earlier this year, in April, we were advised by the Department of Energy that our fiscal year 1981 program had been cut by one-third. And they asked us to extend our finances that we had at that stage through the end of this calendar year, which has put a tremendous strain on our finances.

As of right now, we are 19 days into the fiscal year 1982, even though we have a contract for 5 years, we do not know whether we have any financing.

Mr. BEDELL. If that financing were to be eliminated, in what manner do you believe it would affect the effort toward lower energy consumption in the area you serve?

Mr. MITCHELL. Well, regarding the transfer of those proven technologies classified as renewable energy, our efforts would close down totally in training, information exchange and education.

We feel it is unfortunate that these renewable energy activities have stopped. We think these technologies, these abilities and these talents should continue to be transferred to the marketplace. In fact one of the tasks that we had, that we had identified for ourselves, was to work ourselves out of a job technology by technology within a reasonably short period of time.

We feel that the action that is contemplated, perhaps that has been taken by the Department of Energy, is premature by 1½ to 2 years in each of the basic solar technologies. And we think it is unfortunate also because of the number of the small businessmen who are dependent upon these activities, not only as a means of income and livelihood, but also the services they extend to the small businesses and the homeowners.

Mr. BEDELL. So I presume that your belief is that indeed if there had been funding for another 1½ years, it would have resulted in lower consumption of energy in the area that you serve.

Mr. MITCHELL. At least it would have amounted to a reduction in the use of that sensitive energy that we depend so heavily upon from foreign sources. I think perhaps the actual consumption would have been less and a lot of the solar applications would be looked at, viewed and measured in the context of conservation, because it would be very difficult to keep an accurate measure of the Btu contributions by solar. So the statistics would represent less oil, but the actual use of energy could have been just about level.

Mr. BEDELL. I appreciate your testimony.

Mr. Curry, because of high interest rates, the building trades are not exactly flourishing at this time. I assume your industry depends for a significant part of your work on new construction.

Mr. CURRY. That is correct.

Mr. BEDELL. I read from what you had to say that one of the things keeping you alive at this time is the retrofitting that you are doing, partly because of the energy tax credits.

Mr. CURRY. Absolutely.

Mr. BEDELL. If those energy tax credits are eliminated, what will that do to your industry?

Mr. CURRY. It will have a major effect on plumbing and heating contractors, especially smaller ones.

Mr. BEDELL. Will it result in significant number of bankruptcies, or will it just be they will have to tighten their belt a little more in the immediate future?

Mr. CURRY. Unless there is an influx of new construction, and the interest rates came down, meaning more new homes being built, or there was something else to take up the slack—unless that happens, I don't know what the contractors will be doing.

Mr. BEDELL. What would they do under those circumstances, if they go out of business—do you think there is some other work they would turn to?

Mr. CURRY. There is always unemployment. Normally when a contractor goes out of business he goes to work for a larger firm. He may go to work for a national company, such as General Electric. There is also the loss of his energy saving expertise to the community.

Mr. BEDELL. I am one of those that cannot understand why it makes sense for us to spend a lot of money for a Rapid Deployment Force, et cetera, to go over to the Persian Gulf area, with arms—as compared to putting some money into trying to become energy self-sufficient so we won't have to do that, and providing jobs for people such as you, as compared to providing a job for somebody to take a gun and go over to the desert lands of the Persian Gulf in warfare. It seems to me such a clear choice.

Mr. CURRY. I agree with you.

Mr. BEDELL. We appreciate your testimony.

Mr. MAVROULES. Mr. Chairman, I want to thank both gentlemen for their testimony.

Mr. BEDELL. We now have a panel of three people. Mr. John Russell, the American Baler Co., Bellevue, Ohio, Mr. Warren Reino, North Shore Recycled Fibers, Salem, Mass., Mr. Wayne Bodow, Bodow Recycling, Inc., Syracuse, N.Y.

TESTIMONY OF JOHN B. RUSSELL, GENERAL SALES MANAGER, THE AMERICAN BALER CO., BELLEVUE, OHIO; WARREN A. REINO, NORTH SHORE RECYCLED FIBERS, SALEM, MASS.; AND WAYNE R. BODOW, BODOW RECYCLING, INC., SYRACUSE, N.Y.

Mr. RUSSELL. I am John Russell. Our company, the American Baler Co. of Bellevue, Ohio, is one of the world's leading manufacturers of equipment for recycling and recovery of materials from the solid waste stream, and from normal channels of materials recovery of industrial and commercial scrap. The American Baler Co. is a small business concern, employment approximately 125 people, located in the industrial belt of northern Ohio. The company was founded in 1945, and has been continuously in business since that time. American Baler products are marketed worldwide to recyclers and scrap processors.

I have been an employee of the American Baler Co. since 1960, and have directed marketing activities for the company since that time. During the period of 1960 to date, approximately 50 percent of all products manufactured by the American Baler Co. have been used in the recycling of secondary materials, metal scrap, aluminum cans, paper fibers, corrugated cartons, and compressibles of all types found in the commercial, industrial, and municipal waste-stream.

More than 50 percent of the machinery sold to recyclers, has been sold to small business concerns, those employing 100 or less people, and locally owned and operated.

The investment tax credits made available by the Energy Act of 1978, granting special investment tax credit of 10 percent for the installation of energy saving equipment, and specifically attributable to equipment used in the recycling process, has been a tremendous assistance to our company in our sales program, and to the users of this equipment. Without such benefits, many of the smaller recycling companies would be unable to afford the investment risk required to upgrade or to enlarge the scope of their business activities.

In many cases, the package of the complete material handling and processing system supplied by our company to these buyers, exceeds the net worth of the company buying the equipment. For this reason, financing of this equipment is sometimes difficult, and the payback to the investor for the capitalization of these purchases, becomes difficult to justify economically.

As with any industrial equipment, there is a certain magnitude of scale at which recycling becomes truly cost effective. The availability of the special investment tax credit for the purchase of utili-

zation of recycling equipment, has been particularly beneficial to the small business concerns operating in this activity area.

Significant energy savings can be accomplished by the utilization of more highly efficient equipment in the processing of reclaimed materials.

The American Baler Co. is an active member of the National Association of Recycling Industries, and a sustaining member of the National Solid Waste Management Association. I have personally been very active with both of these trade associations, and have served on the board of directors of the National Solid Waste Manufacturers Association, as president of the Waste Equipment Manufacturers Institute, and am currently chairman of the marketing committee of WEMI.

I feel that I can speak for manufacturing members of both associations, in stating to this committee, the importance of the special investment tax credit of 10 percent for the purchases and utilization of recycling equipment. I strongly support an extension of this investment credit.

Another important aspect in the development of greater recycling activity, has been the SBA loan guarantee program for small businesses engaged in the solid waste and recycling industries. We have personally been involved in three separate programs, where the SBA loan guarantee program was utilized to enable the business owners to enlarge the scope of their recycling activities. Each one of these cases proved to be an outstanding example of small business expansion, and probably could not have successfully matured without these Federal loan guarantee programs.

Recycling of secondary materials provides for some exceptional savings in energy, due to the significant savings in the cost of energy to produce new raw material, as compared to the cost to produce the same end product from the natural or virgin state.

The most remarkable energy savings is in the area of the production of aluminum sheet from recycled aluminum cans. This recycling technique requires less than 5 percent of the energy commitment required to make a ton of aluminum from mined ore.

Studies made by the U.S. Environmental Protection Agency, NARI, and the Paper Stock Institute, indicate that energy savings in the range of 60 to 70 percent are realized from the utilization of recycled paper, in the manufacture of corrugated and paperboard products. In addition to the energy savings, the use of water in the process is reduced to approximately 50 percent of the volumes used in producing paperboard from virgin fiber sources. Steel products manufactured from ore consume two to three times the energy required to produce equal tonnage from the scrap process.

Incentives for recycling, correction of inequities in freight costs for virgin scrap materials, and developing new markets for recyclables can greatly reduce this country's reliance on offshore energy reserves. Each million tons of scrap that is lost, as a raw material, costs this Nation over eight trillion Btu's of energy and more than 1.5 million barrels of oil.

The subcommittee obviously cannot address all of these problems today. The significance of the investment tax credit for recycling, and the SBA loan guarantee program cannot be overemphasized in implementing a successful recycling economy. The American Baler

Co. strongly supports the extension of the recycling investment tax credit.

Thank you.

Mr. BEDELL. Thank you, Mr. Russell. Mr. Reino.

Mr. REINO. Thank you, Mr. Chairman, members of the committee. I am Warren Reino, vice president and general manager of North Shore Recycled Fibers Corp., and Malden Waste Paper. We operate two wastepaper-packing plants here in the North Shore area. I think we represent a classic example of what source separation is all about.

We have, right in the center of our two plants, a waste-burning facility. We remove whatever wastepaper we possibly can for recycling purposes.

Our plants have been in operation in this area for nearly 60 years and process in excess of 30,000 tons of wastepaper a year. This number of tons would increase disposal costs locally some $5 to $6 million annually if this amount of paper were not removed from the waste stream. This figure does not include transportation and rental for equipment to haul waste products to be disposed, which could raise the figure locally $7 million to $8 million a year.

We have prepared testimony which we would like to leave with this committee today in hopes that this information will give you some additional knowledge about the wastepaper business in the North Shore area, and the Northeastern part of our country.

We sell our products to papermills who use wastepaper as a raw material—mills such as tissue mills, de-inking mills, and paperboard mills.

Specifically, we are presenting three basic thoughts. One, a broader picture of wastepaper-recycling problems in the Northeast. Two, some knowledge about the companies that recycle wastepaper in the Northeast and some of their products. And three, reasons for continuing and/or increasing tax incentives.

We endorse and hope you will support the amendments to S. 750. We commend to your attention that portion of the bill which amends and expands the definition of recycling equipment to include all equipment normally used in recycling operations.

What we are saying basically in our testimony is that we can remove more wastepaper from the waste stream in the North Shore area. We then would explore other markets—export, markets in the Midwest, the South, Canada, and so forth. New energy-saving machinery with as high as 50-percent reduction in energy cost and higher production machinery can accomplish these goals.

Our industry needs continued tax incentives and/or tax credits to continue. We ask your help.

Thank you.

Mr. BEDELL. Thank you, Mr. Reino.

[Mr. Reino's prepared statement follows:]

PREPARED STATEMENT OF WARREN A. REINO, VICE PRESIDENT AND GENERAL MANAGER, NORTH SHORE RECYCLED FIBERS CORP., AND MALDEN WASTE PAPER CO.

My name is Warren A. Reino. I am Vice-President and General Manager of two waste paper packing plants in Massachusetts—North Shore Recycled Fibers Corp. in Salem, Mass., and Malden Waste Paper in Malden, Mass. These two waste paper packing plants have been operating in the North Shore Area for 50 to 60 years.

Through several acquisitions over the past 10 years of smaller and/or marginal companies we have become one of the largest waste paper packers in Massachusetts.

We are members of the New England Waste Paper Dealers' Association (some 60 waste paper dealers in New England), the Paper Stock Institute Division of the National Association of Recycling Industries (NARI), and are affiliated with the American Paper Institute (a national organization of paper mills manufacturing recycled paper board throughout the United States).

Our primary responsibility is to generate, grade, and bale as many tons of waste paper (locally) as we possibly can, and sell our products as economically as possible to consuming paper mills making a variety of raw material and finished products made from "Recycled Fibers".

Our purpose for appearing today is to:

1. Provide a broader picture of the waste paper recycling problems here in the Northeast.

2. Provide some generally little known knowledge about the companies who recycle waste paper in the Northeast, and some of their products.

I. WASTE PAPER RECYCLING PROBLEMS IN THE NORTHEAST

One of the most vexing of all environmental problems is solid waste. Our way of life generates daily mountains of paper, glass, metal and plastics. The largest single item among this waste is paper, and there is increasing use of paper in packaging and merchandising.

Of all these items of waste, paper is the easiest to reclaim and recycle. American companies have been doing so long before there was a deep general concern with the environment and with ecology. A little more than one-fifth of all the paper used in the United States in 1980 was recycled.

When industry recycles "post-consumer waste", the paper that has been used by consumers—boxes, newpapers, and similar products—it keeps these from becoming a part of the daily mountain of trash. Moreover, it saves the local government from the need to haul it away and dispose of it.

In 1980 the paperboard industry used some 9 million tons of postconsumer waste, saving disposal costs of about $200 million, to say nothing of valuable landfill and incinerator capacity.

We can recycle more "post-consumer waste" in New England with lower energy costs, transportation costs, and equipment costs. To utilize "post consumer waste" the more popular known grades of waste paper (newspapers, cardboard, and mixed papers) it is necessary for consuming paperboard mills to combine higher grades of waste paper with these lower grades of paper to manufacture their products.

These high grades are not generally in enough supply in the Northeast and must be shipped from the South, or Midwest at high truck or rail rates. High grade waste papers are not the waste that ends up in our landfills, and there is always a market available.

However, there is a need for more "post-consumer waste", or low grades of waste paper in the Northeast. Several consuming companies have to truck low grades of waste paper from the NYC/NJ area at much higher transportation costs. Transportation costs can be lowered to the end user by providing more waste paper locally, rather than hauling from other areas.

Energy and production costs can be lowered by replacing "obsolete" equipment with new and modern machinery on the market today that provide these cost savings features. Equipment purchased ten years ago can be replaced with new equipment today which would provide a 50 percent savings in energy and production costs.

II. KNOWLEDGE ABOUT COMPANIES WHO RECYCLE WASTE PAPER IN THE NORTHEAST

Companies who recycle waste paper in the Northeast are generally in three catagories: 1. Tissue Mills, 2. De-Inking Mills, and 3. Combination Paperboard Mills.

Tissue Mills are mills producing facial, toilet, and other fine tissue grades of paper, and usually use high grades of waste paper as their raw materials.

De-Inking Mills could be the tissue mills or mills de-inking old newspapers only for making new recycled newsprint for our area's daily newspapers.

The Combination Paperboard Mills are the mills using more of the lower grades of waste paper—the type of paper that clutters up landfills and incinerators. I would like to present a little more information to you about combination paperboard mills.

Paperboard is an industry term covering a wide range of products, generally speaking, heavier in weight than paper. Recycled paperboard, known in our indus-

try as well as combination paperboard (made from a combination waste paper fibers) is recognized by the public generally as cardboard.

The products of recycled paperboard are used over a wide area because of its versatility and ease in conversion. You will find it in folding paper boxes, the one with the gray back and used for cereal boxes, soap boxes, soft drink and beer carriers, cigarette boxes, record jackets, as well as for packaging many other products. Other varieties of recycled paperboard are used in making the liners for corrugated cases as well as the fluting (corrugated medium used between the liners).

Recycled paperboard is used in making partitions, a wide variety of protective uses; it is used in large quantities for paper tubes whose end uses are numerous; it is used as the stiffner you never see in book covers, looseleaf covers, photo albums and game boards (checkers, monopoly, etc.); it is the match cover board on the book match and it is the match stem itself; recycled paperboard is the gypsum liners on both sides of a gypsum wall board and it is used in other forms in the building industry.

The recycled paperboard industry uses about 80 percent of the post-consumer waste now used in the paper industry. Some other large users are the recycling of old newspapers to make new newsprint and there are other smaller uses for production of recycled tissue and business papers.

III. REASONS FOR CONTINUING AND/OR INCREASING RECYCLING TAX CREDITS IN THE NORTHEAST

As mentioned above, our business does have relatively high initial startup costs, and continuing fixed, and operating costs compared to many other products on the market today. I did not mention "Markets" or "Market Prices". However, waste paper pricing does have many peaks and valleys, and is usually priced on a supply-demand basis, and generally is tied to the "economic conditions in the country. At the present time prices are very depressed. Some grades of waste paper are selling at lower prices than were in effect 30 years ago. Waste paper dealers must be able to withstand these low prices, and also be in a position to increase productivity and lower costs. They need all the incentives possible to accomplish these needs.

There is a need for more up-to-date equipment. There are more available markets to expand activity in the Northeast. There is no need to consider more burning-type facilities. We can do more source separation—particularly waste paper. We can extend the life of available landfill sites. We can expand into more export markets out of the Boston area.

We can provide more employment in doing more recycling of waste paper. Recycling is an idea whose time has come. It is good for America by any measure. We need incentives to continue, and expand. We need tax incentives that will include all machinery and equipment from the beginning of our operations to the end, not some items in between.

Decreasing or eliminating any present incentives will do much harm to an industry, and many smaller independently-owned businesses, who are doing a great deal to help "Keep America Clean".

In conclusion, we endorse and hope you will support the amendments to provide non-refundable tax credits for investments as outlined in S. 750.

Specifically, we commend your attention to that portion of the bill which amends the amount of energy tax credit by increasing the allowable credit from 10 percent to 20 percent; which extends the eligibility through December 31, 1986 for alternative energy property and recycling equipment; and which expands the definition of recycling equipment to include equipment normally used in recycling operations.

Thank you.

Mr. BODOW. I am Wayne Bodow, an attorney licensed to practice law in the State of New York. I am vice president of Bodow Recycling in Syracuse, N.Y. My firm, Bodow Recycling, is a member of the National Association of Recycling Industries.

I am personally seated on the Standards and Practices Committee of the Paper Stock Institute of America, which is a division of NARI. I am also a member of the American Bar Association Committee on Natural Resources.

I am speaking tomorrow at Copley Plaza for the National Solid Waste Management Association. My topic tomorrow is industrial

waste and what the recycler can expect to recover from the industrial waste program.

I firmly believe that it is the small businessman, the new entrepreneur today, that will generate tremendous savings for our country in the waste energy conservation field. This is a very recent change.

I think it is a shocking statement because the small businessman is a very small portion of our economic impact generally. The reason for that is because big businesses across the country, the large corporations, are in a very capital crunch, world fighting economy, where they have to put all of their dollars into their proprietary product to maintain their proprietary position.

If they take even a penny away from that, they lose their priority and they risk their marketplace.

Now, as a result of that, what is happening is that you find that small businessmen are approaching these corporations, the industrial developers of our country, and they are coming up with energy saving innovations for them. It is only through the small businessman's effort that these programs will take place.

Now, my corporation personally made a proposal to a major corporation to build them an industrial-based steamplant. We showed that corporation that we could undoubtedly—and they agreed with us—that they could get their money back in 18 months on a $1 million expenditure, an incredible savings.

They turned it down. If we were to tell them that they could do it in a year, they would say, "Unbelievable. It cannot work. You cannot do it in a year. You cannot pay it back."

Anyway, we could do it in a year, but now what we have done is gone around and reversed the tables and said, look, we will provide the capital, we will provide all the dollars to make this investment for you. We will own the utility, sell you a steam product that is generated from your waste steam, and maybe they will accept that. They have not yet.

You see, big business, most of their decisions are decentralized. They come from the manufacturer's home office and sometimes that is even a foreign country. They still are concerned with the priority of where their capital dollars must go.

Now, in looking at the decision that now has to be decentralized, in this case out of this country, we have been told that they can obtain the same savings by firing two engineers—$80,000 that they can save by us putting in a steamplant for them—which is a guaranteed savings. Now, why would they want to take that risk?

Well, Congressman, you can help us tremendously by passing and extending the tax-credit program because now we can extend that from an $80,000 savings to a $180,000 savings by doing some creative financing and passing on some of those tax credits.

You must remember for a small businessman to utilize tax credits they must first be profitable. If they are not profitable, they cannot utilize any tax credits.

You can read the rest of my summary, but to stay within the timetable, I am going to skip that.

I want to cover a very significant point, which I don't think has been addressed today, or perhaps that you are aware of; that is, a major disincentive to the recycling community and to the small

businessman is the congressional energy policy statement of the country, and that is to prefer the utilization of primary resources over secondary resources.

Now, what you have there is you have basically depletion credits given to oil, to gas, even the decontrol of energy of these two areas, which will still shovel out an incentive to utilize primary over secondary materials.

Now, the major deterrent to the recycling industry and the major deterrent to the materials recovery business and to the utilization of waste materials out of the waste stream and converting that to energy is an inconsistent marketplace for these materials.

Recently my firm sold maybe five tractor-trailer loads of corregated to papermills. We are producing something like that in 1 day. That is over 1 day—that is our normal sales period for that particular commodity. The five loads were sold over 1 month's period.

There is a tremendous slowdown in that particular area. What is needed is a credit for the recovery of secondary materials or for the utilization of secondary materials as a tax credit of some form.

I recommend that that particular credit be tied into some energy use program, such as the cost of the taxes applied to oil or the taxes applied to gas. All of us have to maintain a fleet of trucks on the road. We spend a lot of money that we could get back.

Likewise, if there was an incentive for a major industry to recover the material and some form of tax credit applied to that, there could be tremendous savings realized.

I know that the President is looking to cut anything he can out of today's budget. Although I gather from your comments, Mr. Congressman, that you favor increasing and extending the tax-credit program, I have made a recommendation to show you where and how you can reduce it if indeed it comes down to that.

My point is that I don't want it reduced at all, but if you must find a way to save money, to pass it through some kind of bargaining in your congressional authority, I recommend that the energy tax credit be limited to $2 million.

The reason I recommend that is that that means you have to make a $20 million investment. Now, my recommendation is to limit that $2 million credit to a particular project. I have seen very few programs across this country that have set out what it was supposed to set out that have been over the $20 million range. When they are that high, generally they are municipally owned anyway and not eligible for the tax credit.

Thank you.

[Mr. Bodow's prepared statement and attachments follow:]

PREPARED STATEMENT OF WAYNE R. BODOW, BODOW RECYCLING, INC., SYRACUSE, N.Y.

Mr. Chairman and Members of the Committee: My name is Wayne R. Bodow and I am an attorney licensed to practice in the State of New York; a Vice President and Stockholder of a small family business, Bodow Recycling Inc. of Syracuse, New York, whose principal stockholder is my father, Charles Bodow. Bodow Recycling Inc. is an active member of the National Association of Recycling Industries (NARI). I am personally seated on the Standards and Practices Committee of the Paper Stock Institute of America, a division of the National Association of Recycling Industries, and I am a member of the Natural Resource Section of the American Bar Association.

Bodow Recycling Inc. has annual sales of approximately $1 million and presently employs under thirty people in its operation. A new affiliate of Bodow Recycling Inc., namely, Recycling Service Company, Inc., is the New York State Distributor for National Baling Press Co., Inc. of Brooklyn, New York.

In 1980, Bodow Recycling Inc. commenced an aggressive expansion program. The corporation obtained a $245,000 Small Business Administration loan guarantee program through Merchants National Bank and Trust Company of Central New York, from the proceeds of which $110,000 was eligible for Recycling Investment Tax Credit. In light of the high interest rates, namely 2.5 points over prime, the corporation could not have made such an investment without the tax credit availability. Approximately $45,000 was spent on interest expense in 1981, which reduced the margin of profitability.

In December of 1980, through unforeseen circumstances, the Federal Government condemned thirty-five feet of Bodow Recycling Inc.'s business property for the construction of Interstate Route 81 ramp program. The corporation's anticipated production, with new machinery, was severely reduced due to the severe business interruptions incurred.

In 1980, the year-end statement shows an approximate $82,000 before tax profit; whereas the six month statement ending April 30, 1981, shows an approximate $2,700 before tax profit.

My point is that a corporation must be profitable before it can utilize tax credits. The recycling industry, as a whole, primarily consists of small family oriented business entrepreneurs that are easily affected by the swings of the economy and the laws, tax incentives and benefits available from all government entities. Yet, it is from this economic sector of the American economy that new creative leadership will create the most significant impact for our nation. Industry, and all forms of big business within our country, keys all managerial decisions on their proprietary line of productivity. For example, a manufacturing plant will only invest capital dollars that increases manufacturing productivity. Most tax laws do not affect our waste products, our by-products, or the recycling stream. It is economically disadvantageous for a major industry to spend a fair union wage of approximately $10.00 an hour to recover a by-product. Consequently, millions of tons of recoverable material enter the waste stream. Yet there still exists a depletion allowance for virgin materials, and no allowance for recovered secondary materials. The Recycling Investment Tax Credit has been a small but greatly appreciated incentative that has encouraged business across the country to make the capital expenditure necessary for secondary resource recovery. Because major corporations persist in maintaining their priority for capital expenditure to be: First, product; second, facility, and third, conservation of energy and material. The role has shifted; energy conservation, material recovery and energy saving innovation now primarily rests with the small businessman—with the new entrepreneur.

I have developed such a program, but my capital resources are limited compared to the corporate giants. My business makes the capital expenditures necessary to recover secondary materials. The capital programs range from an $8,000 baler placed in a factory to recover cardboard, to a $1,000,000 cogeneration steam plant for a small industrial complex. In 1980, a proposal was made by my corporation to a major corporation to build a steam plant at a capital cost of approximately $800,000. It was agreed that the fuel savings, from burning No. 6 oil, would generate eighteen month payback. The Corporation rejected the proposal. A year later, the same proposal was made, requiring no capital from the industrial complex; steam would be sold at a fixed rate. This proposal has been accepted by the corporation's local office. However, the decision is still pending for a firm contract from their corporate headquarters. Without the tax credit available, the net savings to my prospective customer would be approximately $80,000 or, as their management explained, similar savings could be realized by firing two engineers. Certainly, the tax credit could increase the savings passed on by approximately $100,000. A significant impact would be realized locally, benefiting the entire community, if this cogeneration plant is built. There will be no landfill consumption from this industrial complex, as either all material would be consumed as a BTU product, or recycled as a secondary resource. Up to fifteen thousand pounds of steam per hour would be generated from material that had previously entered the waste stream, representing a substantial savings of No. 6 oil.

Compare the success of municipality or community waste to energy facilities, to that of investor owned facilities. The municipal programs must be general and deal with the entire waste stream whereas the industrial program has a specific application and processes relatively clean solid waste that can be controlled by simple in-plant source separation. The failure shut-down rate has been high on the communi-

ty level; industrial co-generation facilities, as far as I know, have a perfect batting average. What happens when a community shuts down a 100 million dollar facility because it doesn't work or can't meet the EPA requirements? Certainly the politicians who pushed the program into existence, have committed political suicide.

I firmly believe that local, state, and federal government have strongly interferred with free market forces that rightfully would have created successful waste to energy programs. It is wrong to legislate flow control measures requiring waste to be directed to a single operated resource recovery facility. I am convinced that a waste product should be viewed as a limited depleting resource. The control of any waste product should be left entirely with the generator of the waste. If a flow control legislation is desirable to necessitate the operation of a solid waste plant, then the control should be exercisable only after the generator of such waste has intended the waste product to have entered that specific waste stream. To do otherwise, in my opinion, you have taken away the individual's property rights which should be protected by the constitution. To me, the waste stream is a pot of gold, and the small businessman historically has been the most productive prospector. As long as the small businessman, the new entrepreneur, have access to all points of this waste stream, new and exciting innovations and technological advances will be made in applying free commerce to creatively utilizing this pot of gold. For example, technology exists to burn residential rubbish at each household in a clean, environmentally safe manner, creating co-generation of heat for that specific household. Likewise, thousand of proposals are pending for co-generation facilities at the industrial level.

I recommend that a ceiling be placed on energy tax credit from any one specific project, the ceiling in my opinion should be $2 million. I have yet to see a facility that costs more than $20 million accomplish what it set out to do within its original guidelines. When it comes to solid waste, small is better. Ten separate $1 million facilities could do 70 percent of the work of one $100 million facility. The technology doesn't exist, in my opinion, to recover all forms of solid waste after it has been mixed together. In June of 1981, my company made a proposal to Jefferson County in New York State to conduct a solid waste study. In that proposal, we included our concept of solid waste management. I am including this proposal and our recommendations in this testimony because I feel it clearly represents the small businessman's approach to solid waste management. I have included the laws of New York in 1980, Chapter 552, which enables the small businessman's approach to solid waste management to be successful. (See appendix "A".)

Patience, time and consistency of effort are perhaps the most important attributes of success. The affect of discontinuing the 10 percent energy investment tax credit at this time would be to defeat the very purpose for which this law was created. Small business does not have the resources, the capital, the sales force, the engineers, etc., to quickly mobilize their efforts in the utilization of new tax programs. Their lead time for such mobilization is longer than their big-brother-business-partners. My business serves and obtains all of its secondary material for processing from the major corporations in my community. Before I, or any other small business, can begin a capital investment program, a contract must be secured from a major business where a service is performed. This process of procuring business is a slow, time consuming affair. Before I could obtain an SBA guaranteed loan, my corporation needed to support their project with a good business plan, good management, and significant assets, but, most important, the ability to pay back the obligation. And where did the ability to pay back the obligation come from?

The ability to pay back the debt always generates from new business contracts obtained from larger corporations. So, the development process is to have your sales force promote a savings program to large corporations. I have entitled this savings program: "Make Money—Let The Recycling Service Company Show You How". Gone are the days of the garbage approach; throw it away, it'll be picked up; spread it around; and let's hope it isn't noticed. Those days are gone forever. Federal, state and local legislators are under tremendous pressure to do something about waste and pollution. Read any daily newspaper and find articles on industry fines for illegal dumping of wastes, air pollution, resources depletion, water pollution and solid waste disposal. No longer can industry continue with the old ways of disposal. Thought must be given to the future. That's why recycling makes sense. Produce energy from waste materials, renew dwindling resources and receive a return on the investment. My salesmen try to open the corporate door by stating that: Bodow Recycling Inc. wants the opportunity to discuss your business' waste recovery potential. But, this process of convincing management to make money through energy and resource conservation is another time consuming, slow procedure. Generally, it has taken our company a year of wining, dining and soliciting to obtain a major new account. When a major new account is obtained, an expenditure of over

$100,000 is generally required to service the account. Theoretically, without the energy tax credit, a proportionately larger investment would be required. The sources of capital for such investments would be significantly reduced without this tax credit. Remember, you must be profitable to take advantage of a tax credit. Consequently, many small businesses, who do not expect to use all of the tax credit, trade the tax credit for a lower interest cost on a true lease program.

S. 750 extends the eligibility period for energy tax credit to December 31, 1986. This bill further recognizes the heavy outlays required for capital equipment to process solid waste, by more liberally redefining eligible equipment. Secondary material recyclers will significantly benefit as their effective capital requirement to accept new business oportunities will be reduced.

The Recycling Investment Tax Credit has the effect of freeing dollars for capital investments in recycling. Its purposes is to promote energy conservation and recovery of secondary materials. Tax credits can only be used by profitable companies. Most companies in the recycling business are not consistently profitable, primarily due to inconsistent markets for their recovered commodities. To promote the use of secondary materials, Congress should provide a depletion recovery credit direct to either the recycler or the consumer of secondary raw materials. I feel that such a credit should be utilized to offset gasoline taxes, or any energy related use tax. When there is utilization of secondary resources, be it solid waste burned for BTU value, tire casings ground for road filler, scrap copper used to make new copper, or wastepaper used to make new paper, there are significant energy savings. For example, there is approximately 95 percent savings of energy when a new aluminum ingot is made from scrap aluminum as compared to making the same ingot from bauxite ore. To maintain a consistent marketplace for the recycler, credit should be given to make secondary materials more attractive to the consumer of these materials. I am hopeful that new legislation is passed that will promote the use of secondary materials and that the Recycling Investment Tax Credit is continued.

In summary, it is the small businessman that is going to make the largest impact on resource recovery and energy conservation in the U.S.A. If the Investment Tax Credit were to be prematurely eliminated at this time, the very purpose of this government tax incentive would be defeated. If this tax credit program is to generate resources and save energy, it must be given a chance for it to be developed and utilized. Often, capital sources for this type of investment is more readily available if the tax credits are passed on by means of true lease programs. In today's capital-crunch-economy, this program of energy tax credits is capable of generating major capital dollars, via the small businessman, which will achieve the goals of conservation of energy and natural resources. Give us the time we need and our country will realize significant conservation of both energy and natural resources. This program can work miracles if it is given the chance it deserves.

APPENDIX A

RECYCLING SERVICE CO., INC.,
Syracuse, N.Y., June 8, 1981.

Mr. ROBERT MCNARY,
Director of Planning, Jefferson County,
Watertown, N.Y.

DEAR MR. MCNARY: We were certainly pleased to have had the opportunity to present our suggestions and proposal to our Advisory Committee on Solid Waste Disposal on May 28, 1981, and we wish to convey our appreciation to Bruce Armstrong, Tom Bowman, Kathy and Katie Mereand and Carlton Sleight for their time and attention.

As a result of that meeting, we are pleased to offer a brief outline of our proposal for your further consideration.

For a sum not to exceed Twenty-Five Thousand Dollars ($25,000.00), we will provide Jefferson County with a resource recovery study that will conclude with a firm turn-key proposal and to construct a resource recovery facility that will:

(1) Reduce landfill requirements to as little as thirty percent (30%) of present requirements.

(2) Recover the maximum cash value from up to seventy percent (70%) of the recoverable materials presently being landfilled.

(3) Provide what will be the first step in any recoverable material treatment system without precluding its extension to accommodate any future proven development in the waste disposal field, e.g., incineration conversion to steam, fertilizers, and paper pulp.

(4) Provide a facility and a system without the commitment of astronomical expenditures for unproven results. (Note: Any proposal is estimated at a capital expense of less than Two Million Dollars.)

(5) Provide a facility whose economics may be such that a private developer may be interested in constructing and operating it.

Our resource recovery study will include:

(1) Detailed investigation of the recoverable material generated in different areas of Jefferson County.

(2) Study of recoverable material generated at industrial sites.

(3) Develop the resource recovery value of the trash component from various sources.

(4) Perform sufficient engineering to include preliminary equipment selections and preliminary general arrangements to arrive at firm turn-key construction costs.

(5) Develop the economic picture relating to the cost of construction, costs of implementation—and other costs—to the salvage value of the recovered materials and to arrive at the cost of disposing of the collected recoverable materials. (Note: If other technologies are added, such as steam generation, bio-mass separation, fertilizers, or alcohol derived fuel, the cost per ton could change to a profit per ton.)

As Tom Bowman suggested, Mr. Nicotera and I would be pleased to make a second presentation to the Planning Department explaining our program.

For your additional information, I have enclosed a brief description of our concept and approach to Solid Waste Management. Should you have any questions, please feel free to contact me.

Very truly yours,

WAYNE R. BODOW, *President.*

Enclosure.

CONCEPT OF SOLID WASTE MANAGEMENT

Our approach to Solid Waste Management consists of two elementary programs:

(1) A comprehensive source separation of solid waste, and

(2) A single resource recovery facility designed to further separate recoverable materials into marketable raw materials and resources.

For purposes of this narrative, please refer to the following definitions: Trash shall consist of food wastes, plastics, and any liquid such as paints, solvents, acids, etc.; Recoverable Materials shall consist of all forms of paper, bottles, cans, metals and wood. (NOTE: See definitions under Title 5 of the Laws of 1980, hereunder.)

New York State, by its enactment of Chapter 552 of the Laws of 1980, has enabled any community to enforce programs of source separation of recoverable materials and trash.

Source separation programs would be put into place at both the household and industrial and retail levels. Incentives for compliance with the resource separation laws are:

At the household level—if recoverable materials are not separated from trash, the trash will not be picked up;

At the industrial and retail level—source separation programs are initiated for economic incentives, as both labor and actual costs are reduced. Our design emphasizes all economically feasible methods of obtaining relatively uniform truckloads of recoverable material, such as paper, metal, wood and glass.

After comprehensive source separation of recoverable material, further separation is economically feasible through a resource recovery facility. Our resource recovery facility will utilize only proven technologies of recovery, such as baling, shredding, magnetic separation, trommels, air classification, shaker tables and physical separation through conveyor lines. This physical design will be related to the marketing of various recoverable material specifications identified by ultimate consumers for the recovered raw materials.

Finally, after the resource recovery facility is "on line", we will analyze, from an investment prospective, the possibility of more technological programs, such as steam generation, etc.

Our educated guess is that such a program can be implemented in Jefferson County for less than Two Million Dollars ($2,000,000), and result in a per ton tipping fee of less than Ten Dollars ($10.00). Such a program would further enable complete landfill maintenance of EPA Standards, as it would result in reducing landfill requirements to approximately thirty percent (30%) of the present landfill volume.

LAWS OF NEW YORK, 1980

CHAPTER 552

AN ACT To amend the environmental conservation law, the general municipal law, the public authorities law, the county law, the town law, the local finance law and the public service law, in relation to solid waste management and resource recovery; and to amend the executive law, in relation to purchasing of paper for state use; and to repeal certain provisions of the environmental conservation law and the general municipal law relating thereto. Became a law June 26, 1980, with the approval of the Governor. Passed by a majority vote, three-fifths being present.

§19. Such law is amended by adding a new section one hundred twenty-aa to read as follows:

§120-aa. Source separation and segregation of recyclable or reuseable materials. The legislature hereby finds that there are circumstances when it is in the public interest for municipality to adopt a local law or ordinance to require the source separation and segregation of recyclable or reuseable materials from solid waste. Pursuant to the authority of this section, a municipality may adopt a local law or ordinance to require that solid waste which has been left for municipal or municipally-contracted collection or which is delivered by the generator of such waste to a municipally-owned solid waste management-resource recovery facility, shall be separated into recyclable, reuseable or other components. These components may include newspapers, corrugated containers, magazines, different colored glass containers, aluminum, metal containers, garden and yard waste, and other elements of solid waste. Prior to exercising the authority of this section to enact such a local law or ordinance, the municipality shall hold a public hearing relating to its proposed provisions and shall give due consideration to existing source separation, recycling and other resource recovery activities in the area, to the adequacy of markets for separated materials, and to any additional effort and expense to be incurred by residents in meeting the proposed separation requirements. The authority provided in this section shall be in addition to and without limitation upon the authority vested in municipalities under any other statute.

In fulfillment of the provisions of this section a municipality may use public lands or buildings or private lands or buildings, open to the public, upon written consent of the owner, as a recycling center or depot for the storage of recyclable materials. The office of general services and any other agency, authority or commission holding title to lands or buildings in the name of the people of the state shall fully cooperate with any person acting under the authority of this section to establish a recycling program, provided that such use is not inconsistent with the principle purpose of such lands or buildings, subject to local zoning restrictions.

Mr. BEDELL. Thank you very much.

Mr. Mavroules?

Mr. MAVROULES. I really don't know where to start, Mr. Chairman. I think the testimony this morning is remarkable. I would like to commend all three of you gentlemen.

Just to pick up on the last speaker here, we could do a lot more if we could take the $17 million in royalties that the President got in his last tax package that passed through the Congress of the United States and perhaps make some money available to the small business people of this country.

That is a fact, by the way, which was part of a giveaway program taking place in Washington to get the tax package through. It is absolutely insane, and the American people, you and I, will pay for that very heavily, at least in my opinion, in the next 3 or 4 years, unless some changes are made.

I think the intent here this morning is to try to assist you and all small businesses.

Let me just ask one question. Are you familiar with the plant in Saugus? Are you involved with that at all in any way? Do you make parts for it? It is a steam generating plant, Mr. Chairman, which produces steam for General Electric; it is the largest manu-

facturer in the district. They simply cannot produce enough steam from waste materials. It is an amazing plant.

Any of you familiar with that at all?

Mr. REINO. We are the company trying to remove some of that wastepaper from that facility.

Mr. MAVROULES. I have no other questions. The more you talked, the more I became frustrated with what went on during the last tax package. If we had some of those funds back, we could balance the budget, we could do a lot of things for the small people of this country.

Mr. BEDELL. If I interpret your testimony correctly, what you are all saying is that there is significant opportunity for us to make better use of the waste materials that we now generate in our society.

Mr. BODOW. Yes.

Mr. BEDELL. Do I correctly interpret what you say further, that we now have tax laws which are there to encourage, for example, production of oil through accelerated depreciation, that we have all the different benefits for the use of nonrenewable energy resources, as compared to the tax laws that we have that would encourage the use of waste materials or secondary materials? Is that what I am hearing you say?

Mr. BODOW. Yes, sir.

Mr. BEDELL. Kind of crazy, isn't it?

Mr. RUSSELL. If I could address your point there for a minute, I have been personally rather close to the Washington affairs of our two associations and have been concerned that the impact I see from the Department of Energy grants and the study contracts which have been proliferating here over a 3- to 4-year period, that these areas of investigation have pretty well completely ignored the energy savings aspects of recycling.

The oil displacement tradeoffs and the alternate sources of energy have been the two big popular areas of concentration of that program. I think that they don't recognize really the inherent conservation of materials and resources, and the diminishing natural resources in North America, but also the significant energy savings that could result from the use of secondary materials in producing new raw materials.

I think we have studied some of these options long enough. I think it is time to implement what has been learned.

The tax credits and the improved depreciation allowances are certainly the kinds of tools that are going to enable the private sector I think to get on with this business of helping to resolve this energy crisis.

Mr. BEDELL. I have been trying to hold the staff off because we are short of time, but one staff member is anxious to ask a question.

Mr. ROSENBERG. A question first to Mr. Reino. You referred in your testimony to S. 750, which I believe was introduced by Senator Heinz. Just for the record, I would like to clarify what is the legislation that you are commending to the committee.

Mr. REINO. There is a part of that law that specifically relates to recycling equipment, which they want to reduce to 10 percent rather than 20. Additionally, including all the equipment used in

recycling of secondary waste, I think it does not include all the items for recycling purposes.

Mr. ROSENBERG. That really leads to this question. Mr. Russell, you talked about the SBA loans available, loan guarantees——

Mr. RUSSELL. Yes.

Mr. ROSENBERG [continuing]. And how they are useful in the work of your company. My understanding is that one of the problems that we have with the tax credit legislation that is already on the books is that it is rather limited in how they define pollution control, that the pollution control laws today limit the tax credits to removing pollutants from the stream as they are about to enter the air or water, but they are not available for processes that use less material or create less pollution in the first place.

Is that why the SBA loans take on greater significance?

Mr. RUSSELL. Yes and no. In my experience, we have been involved with two or three programs whereby the total scope of operation of a small business concern was considerably helped by the SBA loan guarantee program, even though they were not qualified under the terms of the energy tax credit for total tax investment credits for the entire scope of their expansion.

Mr. ROSENBERG. This is SBA pollution control loan guarantees?

Mr. RUSSELL. Yes.

Mr. ROSENBERG. In Washington we have heard some discussion on the industrial revenue bond issue, that these pollution loan guarantees are sometimes coupled with small issue IRB's. Could you talk about that?

Mr. RUSSELL. There is discussion at the present time in one of the Senate committees on a bill to enlarge the scope of the investment tax credit program to include programs to purchase equipment to the entire aspect of a recycling or a solid waste recovery or a pollution abatement industry.

I am not qualified to offer an opinion on any of this at this point. But I do know that the pollution control aspects of the SBA loan guarantee program were very beneficial to two companies that I am aware of in the solid waste processing field.

Their processing equipment, such as shredders, balers that were used in their process, were eligible under the tax aspect, tax investment credit aspects, but they were not allowed any investment credit for supportive equipment for their processes other than equipment that was actually involved in the processing of the material itself.

Mr. ROSENBERG. So the SBA guarantees and the financing from the IRB's would be used for the support equipment?

Mr. RUSSELL. Yes. In many cases it helped to make the whole project viable.

Mr. ROSENBERG. Could the project have gone forward without that?

Mr. RUSSELL. Very likely it could not because it was an alternative financing method for the expenditure.

Mr. ROSENBERG. Thank you, Mr. Chairman.

Mr. KULIKOWSKI. In your testimony you spoke of the special investment tax credit of 10 percent for the installation of energy saving equipment. You also spoke of the helpfulness of the acceler-

ated depreciation system that was enacted as part of the President's tax plan.

Mr. RUSSELL. Yes, sir.

Mr. KULIKOWSKI. As part of the President's tax plan there is also an increased investment tax credit, not specifically limited to energy saving equipment, but for investment in general.

Do you see that as being helpful?

Mr. RUSSELL. Yes; absolutely. I think it would be more expansive in its benefits than the simple investment tax credit for recycling equipment and energy saving investments. However, that is a general business stimulus there.

Mr. KULIKOWSKI. Thank you.

Mr. MAVROULES. One final question to Mr. Bodow. You talked about secondary materials and tax credit for those. Certainly your prepared statement is quite lengthy. Is it in here?

Mr. BODOW. Yes, it is, but I would like to expand in one area just brought up.

The Small Business Administration has numerous programs that were passed by Congress and put into effect. However, it is my understanding that many of these programs have not been funded in the current budget.

I feel that that is a tremendous setback for the small businessman in particular, and for the relationship of the small businessman to the energy tax programs that we are talking about.

The one particular program that bothers me a lot, affects me personally, is the displaced business loan program. Aside from that, the problem is that in today's economy we can only borrow money maybe on a 7-year basis, whether it is for construction of new equipment facilities or the purchase of the equipment itself.

So, it is a combination of real estate needs and equipment needs that develop the facilities that create the energy saving programs and utilize the tax credit.

The Small Business Administration has been the major impetus in enabling these funds to work together to borrow the money from. The sad portion of it is that there are apparently no direct funds available. I would like to see some budgetary funding back to the SBA.

Mr. BEDELL. We would, too, but it probably won't happen, I am sorry to tell you.

We appreciate very much your being here and your testimony.

Our last witness is Mr. Nicholas Staub.

TESTIMONY OF NICHOLAS STAUB, DIRECTOR, INDUSTRIAL FABRICS ASSOCIATION INTERNATIONAL

Mr. STAUB. Chairman Bedell, Congressman Mavroules.

Mr. BEDELL. Your entire testimony will be made a part of the record.

Mr. STAUB. Let me introduce myself. I am Nicholas Staub, president of Bailey & Staub, Inc., New London, Conn., awning manufacturer, established in 1857 and employing 16 people.

Today I am representing the North East Canvas Products Association, which consists of 68 awning companies in the New England

States and upper New York State. These are small awning shops, employing from 2 to 20 people.

I am also representing the Industrial Fabrics Association International, of which I am a director, which has 450 awning manufacturers, of which the typical firm employs from 8 to 12 people.

Most of the awning companies have been in the business for many years, typically two or three generations. Our firm is possibly the exception, in that I represent the fourth generation.

Our main concern is that the awning is a proven, known energy-saving design. It has been doing this for thousands of years, yet we are not recognized as a tax credit in the Energy Tax Act of 1978.

This concerns us immensely. We realize that this is partly our fault, due to our not having stated our case before a congressional committee, and we thank you for giving us this opportunity to do so today.

It has been proven by the American Association of Heating & Air Conditioning Engineers that canvas awnings with a southerly exposure will exclude the heat gain through the windows by 55 to 60 percent and on the westerly side the savings is between 7 and 77 percent.

A copy of this report is included.

Also, the trend in building construction today has been to more glass panels, which makes the awning shading device even more important.

I am enclosing a report by Kenneth Schultz, registered mechanical engineer, to support the above statements.

The awning industry is making a solid effort on its own to promote energy conservation, as shown in the enclosed advertising pamphlet. We, the awning manufacturers of this country, know that our product works, is functional, and will save the cost of the awning in 5 to 8 years.

Canvas awnings are a small, custom business. There is no national business. Canvas awnings are the obvious commonsense approach to energy conservation.

As recently as 30 years ago every store and home in the country had awnings. With new energy realities, their usage needs to be encouraged. They are as American as apple pie. They are a traditional technique whose time has come again.

I hope you will look upon these reports favorably and include us in the 15-percent tax credit.

Thank you.

[Mr. Staub's prepared statement and attachments follow:]

PREPARED STATEMENT OF NICHOLAS STAUB, PRESIDENT, BAILEY & STAUB, INC., NEW LONDON, CONN.

Gentlemen: Let me introduce myself. I am Nicholas Staub, president of Bailey and Staub, Inc., New London, Connecticut, awning manufacturer, established in 1857, and employing 16 people. Today I am representing the North East Canvas Products Association, which consists of 68 awning companies in the New England States and upper New York State. These are small awning shops, employing from 2 to 20 people. I am also representing the Industrial Fabrics Association International, of which I am a Director, which has 450 awning manufacturers, of which the typical firm employs from 8 to 12 people. Most of the awning companies have been in the business for many years, typically two or three generations. Our firm is possibly the exception, in that I represent the fourth generation.

Our main concern is that the awning is a proven, known energy-saving design. It has been doing this for thousands of years, yet we are not recognized as a tax credit in the Energy Tax Act of 1978. This concerns us immensely. We realize that this is partly our fault, due to our not having stated our case before a congressional committee, and we thank you for giving us this opportunity to do so today.

It has been proven by the American Society of Heating and Air Conditioning Engineers that canvas awnings with a southerly exposure will exclude the heat gain through the windows by 55 to 60 percent, and on the westerly side the savings is between 72 and 77 percent. A copy of this report is included.

Also, the trend in building construction today has been to more glass panels, which makes the awning shading device even more important. I am enclosing a report by Kenneth Schultz, Registered Mechanical Engineer, to support the above statements.

The awning industry is making a solid effort on its own to promote energy conservation, as shown in the enclosed advertising pamphlet. We, the awning manufacturers of this country, know that our product works, is functional and will save the cost of the awning in five to eight years. Canvas awnings are a small, custom business; there is no national business. Canvas awnings are the obvious common-sense approach to energy conservation. As recently as 30 years ago every store and home in the country had awnings. With new energy realities, their usage needs to be encouraged. They are as American as apple pie. They are a traditional technique whose time has come again.

I hope you will look upon these reports favorably, and include us in the 15 percent tax credit.

[NOTE: See appendix D for additional material submitted by Mr. Staub.]

Mr. BEDELL. Thank you very much, Mr. Staub.

Mr. Mavroules.

Mr. MAVROULES. I have just one question, Mr. Chairman.

Have you talked with the Department of Energy in relation to a request for a tax credit? Is this the first time you have testified on this?

Mr. STAUB. The first time I have testified. But the people out at the Industrial Fabric Association have gone to Washington and talked to people.

Mr. MAVROULES. Why would they not recognize your product?

Mr. STAUB. I don't know that answer. Most of it went through before we were aware it was happening, I think, really.

Mr. MAVROULES. Thank you. I have no further questions.

Mr. BEDELL. Just so you understand, this committee is not the proper committee to make changes in the tax laws. It is good that you have come before us because you have communicated to two Members of Congress your concern. But it would have to go through the Ways and Means Committee to make changes in our tax laws.

You have informed at least this chairman of something that I was not aware of. We would not want to fool you to think we could go back and immediately change a tax law through our committee.

Mr. STAUB. We are just waking up late. My main reason is representing small businesses of this country, that really didn't get a fair shake when the act was put through.

Mr. BEDELL. It seems to me you have made a very good point. Too bad we didn't have this a long time ago.

We appreciate your being here and your testimony. Thank you.

Mr. STAUB. Thank you.

Mr. BEDELL. Mr. Blakelock, has your gentleman shown up yet or not?

Mr. BLAKELOCK. No. I spoke to the staff director. We will send to you and your committee a copy of what we would have presented.

Mr. BEDELL. It will be made a part of the record.

Mr. BLAKELOCK. We are very much aware of the tax credit. We have taken advantage of it. We want it to continue. But I am not in a position to answer any questions that you may have.

Mr. BEDELL. We would ask you please get that testimony to us within the next week.

Mr. BLAKELOCK. Yes; it will be.[1]

Mr. BEDELL. Is there anyone else in the audience who wishes to be heard before we conclude the hearings?

TESTIMONY OF RAYMOND A. DeNUCCIO, PRESIDENT, PLASTRONIC ENGINEERING CO., INC., HAVERHILL, MASS.

Mr. DENUCCIO. I hadn't planned on speaking. I am Ray DeNuccio, president of Plastronic Engineering, in Haverhill, Mass.

Basically, I would like to get away from the administration and the tax matters. I feel all this didn't happen in 8 months. I feel you gentlemen are representing small business. However, it is disturbing to see there are only a few small businessmen present because I know there are a lot of us voicing this tax credit.

Again, I am sorry to say that most of us are not really that aware we are going to spend that kind of money on our own without some type of tax incentive. If I use the figures of Shetland and the amount of companies that they said they housed—and this one plant alone being 12,000 barrels—it is substantial—I don't know how we could afford not to keep some type of incentive program available to small business, since there are so many small businesses consuming thousands of barrels of oil a day.

I looked at this bill locally of passing on the charges to the small businessman on a State level. I like to think our Congressmen are not going to allow that to happen. If you think the South has drawn the textiles, just think of the rest of the companies.

We have to be fortunate that our company supplies companies all over. The only reason we have not moved is that we live here locally, but I don't believe that is the feeling of a lot of companies.

I also think that we should have had available to the small businesses the same type of help that we allow the homes, some type of an audit, not just to a few—I think we had something like 300 in the whole State—but to every small businessman.

We happen to use 27,000 gallons of oil a year. That might be small by some standards. But if we reduced just ourselves by 20 percent, you can see how much money and oil we are talking about.

So, I think it is important that we do keep the tax credit. I think you ought to look at some type of small business assistance programs to help us. I don't think it is just onesided. I think it is more than one avenue.

That is all I have to say.

Mr. BEDELL. Mr. Mavroules.

Mr. MAVROULES. I can appreciate what the gentleman is saying here this morning, Mr. Chairman. He typifies the small business person, not only here in the Commonwealth, or New England, but

[1] See app. E.

our problems multiply here because of the huge energy costs, as I stated in my opening statement.

Let me take a bipartisan position, if I may, this morning. I expressed my views on what I think is going to happen, but in the entire tax package we do have the accelerated depreciation, which I hope you will take advantage of, the capital cost recovery part of it.

I don't know if your business is big enough at this point where you are buying equipment and vehicles, but I imagine you do.

It is our job to do what we can to assist all small business. I agree with the gentleman from New York when he stated before that if there is a genius in this country, it is not in the big industry, but in small business people throughout the country.

We are going to assist them to get back on their feet. I know where you are coming from. We are here for that purpose this morning.

You mentioned a State program. That was mentioned by Mr. Molin when he was here. I was not aware of that until it was read into the record this morning. I can assure you I will be talking with your State senator sometime before the day is out, perhaps sometime tomorrow. That is not a Federal program though. It is not Federal legislation.

I don't know if you were here before. Let me reiterate. The small business community in Congress is well-attuned to the problems of the small business people in this country. We are not the ones cutting back.

They were talking about solar energy before; 73 percent of solar research and development funds have been reduced in this budget. I think we are going the wrong way. When we start talking about energy and tax credits, the answer is not digging more holes for oil in California. The answer is in alternate sources and renewable sources.

I just want you to know I appreciate what you are saying, and I know where you are coming from. We will do all we can to assist you.

Mr. BEDELL. We appreciate your statement. Thank you very much.

Is there anyone else that would have anything to add before we close our hearings?

If not, I want to thank you, Congressman Mavroules, for having the hearings here. I think they have been very helpful.

I want to thank the people who have been here in attendance. I want to thank the staff for the help they have given us as well.

The hearing is adjourned.

[Whereupon, at 12 noon, the subcommittee adjourned, to reconvene subject to call of the Chair.]

APPENDICES

Appendix A.—Letter From New England Fuel Institute Opposing the Elimination of Consumer and Industrial Tax Credits for Solar and Conservation Measures

New England Fuel Institute

20 SUMMER STREET • P.O. BOX 888 • WATERTOWN, MASSACHUSETTS 02172 • (617) 924-1000 • Telex: NEFI-WTN 922-401

October 9, 1981

The Honorable Nicholas Mavroules
1204 Longworth House Office Building
Washington, D.C. 20515

Dear Congressman Mavroules:

The New England Fuel Institute and its 1,264 heating oil distributing members, request that you do everything possible to oppose the Administration's plan to eliminate consumer and industrial tax credits for solar and conservation measures. Such a move will be shortsighted and not in the long range energy interests of New England.

There are about 12,000 solar heating installations throughout the region, the majority of which are adjunct systems to existing oil heating systems. 10% of these installations have been made by NEFI member heating oil distributors. This is a distinct contribution to New England's energy economy, that must be continued.

We request your prompt support of the Harkins-Jeffords House Resolution endorsing the continuance of solar and conservation tax credits.

Sincerely,

Charles H. Burkhardt

Charles H. Burkhardt
President

APPENDIX B.—STRATEGY PAPER PREPARED BY THE IMPLEMENTATION GROUP OF THE NEW ENGLAND CONGRESS

STRATEGY PAPERS

Prepared by the Implementation Group

of the

New England Energy Congress

July, 1980

The New England Energy Congress is a project of the New England Congressional Institute. Co-sponsored by the New England Congressional Caucus, it is funded by a grant provided by the Office of the Secretary of the Environment, Ruth C. Clusen, Assistant Secretary.

SMALL BUSINESS ENERGY BROKER PROPOSAL

BACKGROUND

This proposal originates with the New England Energy Congress, an ad hoc, federally funded organization, assembled to advise the New England Congressional Delegation on the energy needs of the region. During its ten months of deliberation from May 1978 to February 1979, the delegates to the Energy Congress developed a package of action-oriented recommendations aimed at alleviating extreme dependency of the region on imported oil to meet its energy needs. After a thorough review of existing and pending conservation legislation, it became apparent that government efforts had failed to address the conservation needs of the millions of small businesses throughout the U.S. whose actions are severely limited by both informational and financial constraints. The forerunner to the current proposal appears in The Final Report of the New England Energy Congress, A Blueprint for Energy Action. That draft proposal received the unanimous support of the members of the Energy Congress, and it is anticipated that the proposal will have the unanimous endorsement of the Congressional Delegation from New England. Additionally, the governors from the states participating in the pilot phase are expected to endorse this proposal.

The purpose of the proposed Energy Broker (EB) is to establish a source of technical assistance in all areas of energy for small businesses. This technical assistance differs from existing assistance programs in that it not only recommends specific products or services to a small businessman, but also notifies the vendors of those products or services that the small businessman is a qualified sales lead for the needed product or service. The EB is designed to respond quickly and reliably to client inquiries through a network of participants capable of meeting the diverse energy needs of small businesses throughout the region. A monitoring and evaluation component is built into the program to insure that information, products and services are delivered in a timely and responsive fashion.

The primary participants in the EB will be the six New England State Energy Offices. The Smaller Business Association of New England (SBANE) will be involved in encouraging small businesses to use the EB's services and in soliciting small businesses that provide energy-related products and services for EB vendor listings. A segment of the small business community will be individually addressed through the Technology Commercialization Centers of the Department of Commerce. The New England Minority Purchasing Council will also be involved to assure that minority businesses will participate actively as both vendors and clients. Data capability, feedback/followup functions, and some regionally shared technical/engineering expertise will be housed in an EB central office. The location of the central office is still to be determined. Among the suggestions made to date are relying on an existing university-affiliated business resource center or conducting a qualified bidding process, with each state submitting the names of several preferred non-profits

Finally, an EB Advisory Board will be formed which will include a cross-section of authorities on small business and energy conservation. The Board will advise on EB organization and function and will be responsible primarily for various structural and evaluative aspects of the program and for broad external coordination matters.

BACKGROUND PERSPECTIVE

It has been estimated that small businesses* comprise 95 percent of the 9.5 million commercial and industrial firms in the United States. In the six-state New England area, the migration of larger manufacturers to more favorable business and labor climates in the South has left the remaining companies to bear an increasing share of the tax burden. Overall, the business climate - somewhat bleak for much of the past ten years - has worsened as costs for energy, transportation, and materials have continued to rise.

NEW ENGLAND BUSINESS

Typically, smaller businesses in New England are located in 19th and early 20th century buildings with extremely low energy efficiency. Most of the machinery employed is less productive and more wasteful of energy than equipment now produced in the United States and abroad. Vintage oil-fired boilers and distribution systems used for space heating and process steam continue to be relied upon long after retirement age, in spite of tax write-offs and energy incentives, due to the chronic, paramount problems of decision-relevant information and capital formation.

IMPACT OF ENERGY COSTS

While escalating energy costs seriously affect the cost of doing business for all segments of the industrial and commercial community, the effects on small business are particularly damaging. Energy costs have further undermined the competitiveness of small businesses at a time when the entry and survival of new firms in the marketplace is increasingly difficult. While many large firms (such as Digital Equipment Corporation) have reduced energy consumption to as much as 50 percent of their 1973 levels, smaller businesses in general have made little progress in conservation.

Small businesses, typically, do not retain the in-house expertise to monitor energy consumption and changes in that consumption over time. Unlike larger businesses, the initiative to reduce consumption typically rests with the proprietor or a manager who is responsible for the day-to-day operations of the firm. This absence of energy-dedicated staff prolongs the time during which conservation measures are identified and action takes place. To many small firms, the most practical approach is to merely pass increased energy costs on to their customers.

Small businesses often have short-term leases or even monthly rental space, so there is no cost-beneficial option for decreasing the building energy consumption. The lack of technical expertise in energy conservation makes it hard for management to evaluate even those energy conservation steps of which it is aware. It costs as much for the small business to determine the best measure for their low-production operations as it costs larger businesses for their higher production processes. It is possible that the same conservation measure, once evaluated, can be used widely by a big business where the smaller business faces the same cost of decision making for a much smaller scale benefit.

* As defined by U.S. Commerce Department criteria.

INFORMATION

Existing conservation information is not packaged properly to meet the needs of the smaller businesses. Typically, a request for information from a federal, state, or local energy office is met with an excess of generic, unusable, untargeted information through which the inquirer must sift to identify any directly relevant material. The small businessman needs decision-relevant information - specific methods, products, and vendors - and many current government agency responses make specific action impossible without the expenditure of considerable time and effort.

LARGE BUSINESS/SMALL BUSINESS

Small businesses have few examples to follow. The ability of larger corporation managers to learn from the experience of both other corporate divisions and large industry in general greatly exceeds that of the small businessman. Large firms know of the exceptionally successful programs of IBM, Dow Chemical, Raytheon, G.E., and others, but awareness and general applicability of these programs among small firms - where practical detail is essential - is indeed limited.

There presently exists no program or institution dedicated to delivering the follow-up services so essential to small business assistance programs. Small firms seldom respond to printed recommendations. Instead, on-site visits, phone calls, and other personalized follow-up activities are critical in providing the impetus which culminates in a specific action. For these reasons and the inadequacy of financial incentives, existing federal provisions for small business energy conservation have met with limited success.

Given a somewhat unfavorable business environment, small businesses are forced to respond to problems on a day-by-day basis with little time to systematically analyze and set up a comperhensive energy conservation program. Cash flow and return-on-investment considerations generally preclude the hiring of energy auditors or consultants and few small business executives or their plant managers can afford the time to review reports, product literature, or technical publications. A one-day "how-to-do-it" workshop is the typical limit for other than on-the-job training, and this is possible only when the subject is directly related to a clearly recognized problem.

Experience gained with the small business community indicates that direct, timely, and low-cost, reliable solutions are what keep small businesses alive. With capital and time in extremely short supply, any emphasis on energy problems must be closely coupled with a clear indication that solutions are possible and that an immediate step can be taken. If a central point of contact exists which will assist in an immediate, objective assessment of need and identifying possible sources of reliable assistance, there is a high probability that the small businessperson will take that step. However, if this initial action does not result in a clear indication of at least one route toward a solution, it is unlikely that the client will pursue the matter further unless the problem is especially critical and immediate.

In short, the day-to-day exigencies of small business are such that once a problem is recognized as important and in need of solutions, the small businessperson will take action only as long as information and assistance are readily available. As long as questions can be understood and answered credibly and directly, and as long as the next step or source of assistance - be it consultant, vendor or no more than a firm which has successfully solved the same or a similar problem - is clearly identified, he will move forward. Without this assistance, the probability of action on a matter relating to energy conservation is low. A great deal of

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"hand-holding" and match-making are needed from an organization comprised of trusted, responsive, and competent professionals. State agencies, industrial associations, and private consulting firms may, in the aggregate, possess such capabilities, but none provides the "one-stop service" badly needed if small businesses are to take effective, timely action to conserve energy.

PROGRAM OVERVIEW

The basic objective of the EB is to assure that the small businessman gets decision-relevant information, and that appropriate follow-up is initiated to assure that the businessman acts on that information. As active participants, government agencies and associations in the individual states must make an aggressive effort to reach out to the clients and stimulate use of the services. Equally important, these and other organizations within the state (such as the Department of Commerce) must reach out to reliable vendors of energy-related products and services to make sure that they are listed with the EB. When a client contacts the EB for assistance, the response must be direct and relevant; where a product or service is recommended, the appropriate vendor(s) must be notified for follow-up with the potential customer. Feedback must be obtained at every level of the process to assure that the EB knows what action takes place or does not occur and why.

A simplified view of the EB as it would relate to the small businessman's energy-related problems is presented in Figure 1. As presently planned, the EB will involve a number of interrelated functions:

1. Advertising and promotion of service
2. A database containing
   - energy conservation methods and products proven successful in industrial/commercial use ("Fact Sheets", reports, articles)
   - product manufacturer's data sheets
   - directory of vendors of products and services
3. Client inquiry and personal interaction with EB staff
4. Response preparation
5. Information/recommendation to client and vendor referral where appropriate
6. Client and/or vendor action
7. Tracking and feedback (concerning action taken by client or vendor)
8. Follow-up where energy conservation action was not taken
9. Program evaluation
10. EB Advisory Board (states, funding agencies, SBANE, DOE, others)

The sequence of steps is shown graphically in Figure 2 and discussed in the following sections. As Figure 2 illustrates, the states will have the option of participating jointly with the central office in virtually all aspects of EB operations. A more detailed flow chart of the inquiry and follow-up processes is provided in Appendix A.

PHYSICAL STRUCTURE AND CENTRAL OFFICE-STATE INTERACTION

The EB will be comprised of offices in the State Energy Offices in each of the participating states and a central office in a yet to be determined location. The operating relationship between the staff members of state offices and the central office will vary according to the structure of each state's energy conservation program. In most cases, the state energy office will play a lead role in the EB and their staff members will work closely with EB staff in all aspects of the program. As noted below, phone tie-lines and remote computer data terminals

FIGURE 1

A USER PERSPECTIVE OF EB OPERATIONS

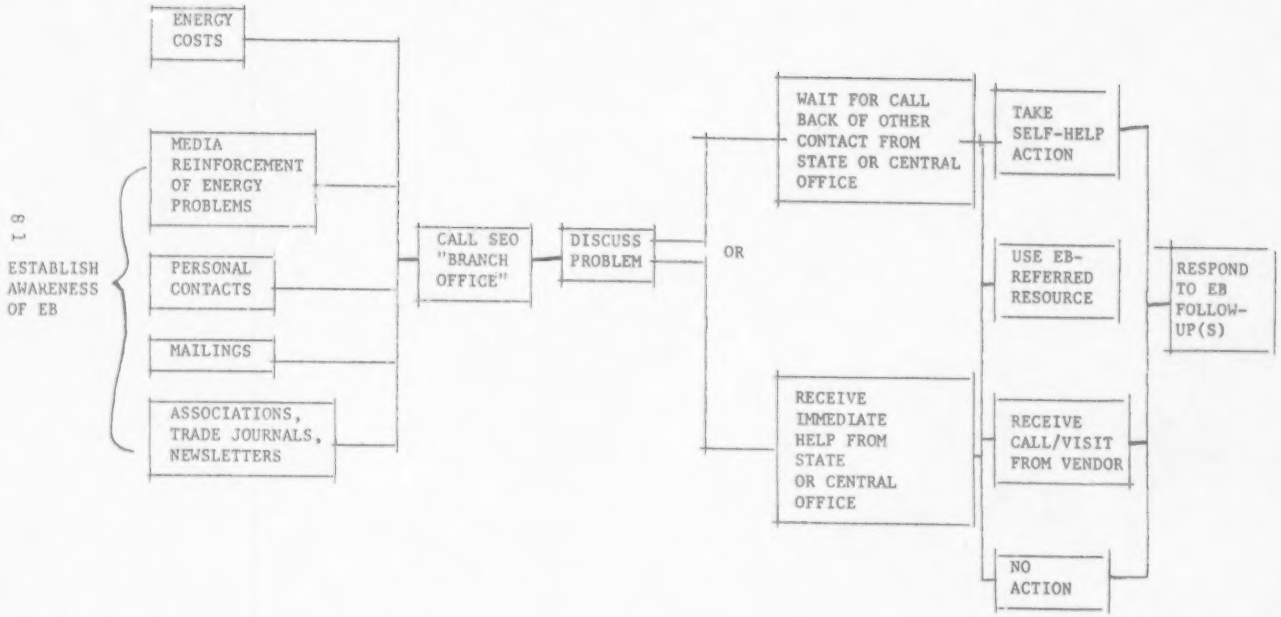
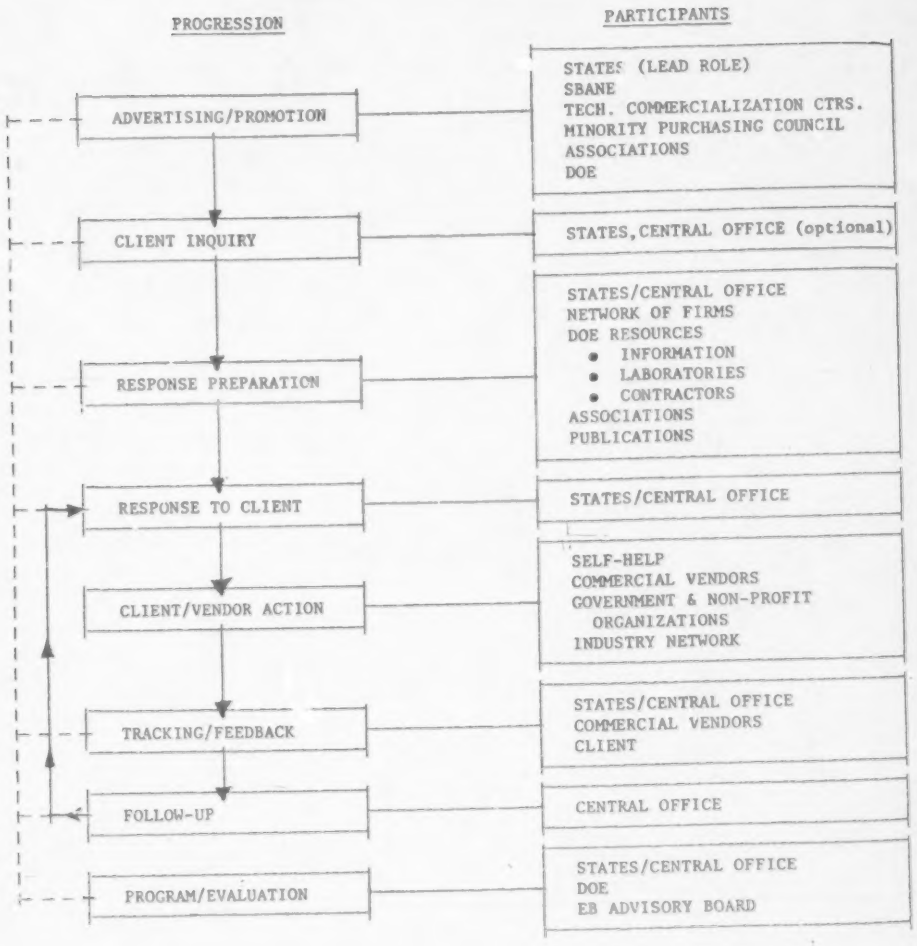


FIGURE 2

EB PROGRAM
PROGRESSION AND PARTICIPANTS



in the state offices will foster continuing expansion of the files and database and quick, efficient service to clients. As a minimum, the states will be expected to provide lead roles in vendor and client outreach activities.

The central office will set up a training and orientation program for state EB participants to establish from the outset a close professional working relationship between central office and state staff members. A rotational program will be explored by which individual central and state office staff can periodically switch roles for several weeks, thereby strengthening the total system capabilities.

ADVERTISING AND PROMOTION

The individual states will play a major role in creating awareness and use of the program by the industrial and commercial communities. Vendors must be identified and contacted to assure their active involvement. An extensive listing of reliable sources of energy conservation products and services must be established and maintained, and state efforts are essential to this end. Various methods to advertise and promote use of EB services will be employed by state energy and economic development agencies including media announcements and reports, trade publications, direct mailings and/or a toll-free phone number. Seminars and workshops will be sponsored in collaboration with industrial, commercial and business associations, colleges and universities and DOE offices. EB staff will assist through speaking engagements to a broad range of groups.

EB DATABASE

The EB database is a key element of the program. The database will be a file of proven energy-related methods, products, vendors, and services and "Fact Sheets" describing specific energy conservation techniques. The database will be developed and maintained by the EB with the close cooperation - especially in regard to vendors - of various state offices. "Fact Sheets" for use in inquiry response activities will be developed, as required, through a variety of technical resources included in the EB organization (central office, state offices, SBANE, networking with firms and individuals in the region, etc.) and commercial firms. The development of the EB database will be a continuing high priority of the central office effort from the outset with the files and computerized retrieval system located at the central office. Products and services to be included will be carefully selected based upon such factors as reliability, cost effectiveness, customer satisfaction and vendor competence. Product qualification may be the result of tests performed at national, university, state and/or private laboratories or simply the result of the product's acceptance and use within the industrial or commercial sectors. All energy service providers will be subject to the scrutiny of the energy office of the state(s) in which they operate. Each state energy office will be asked to review all products and services considered for inclusion in the EB data base to identify those that are not deemed suitable for recommendation to client firms. Products and services not in compliance with state regulations will not be considered for inclusion.

CLIENT INQUIRY AND INTERACTION WITH EB STAFF

Service to the client community will be provided by state energy offices and the EB central office according to the nature of the inquiry and the technical expertise available in each organization. For example, Massachusetts presently offers substantial technical assistance to the industrial community through direct, personal contact. The Massachusetts Office of Energy Resources has for a number of years provided an energy conservation counselling service to commercial and industrial

firms throughout the state. Thus, the plan to be implemented in Massachusetts will provide for an integrated, coordinated effort which may involve such features as remote terminals providing immediate access to the central database located at the central office and phone tie-lines to allow client calls to be shared with or switched to expertise resident in each office.

RESPONSE PREPARATION/RESPONSE TO CLIENT

In satisfying client needs, several levels of interaction and assistance are seen as desirable:

- Phone discussion of the problem with recommended solution(s) provided immediately using EB terminal for data retrieval and/or conference call.
- Phone discussion of problem followed by a letter, "Fact Sheet(s)", product or service brochures, listing of sources for information, equipment and/or services, etc. - all based upon EB information and staff expertise.
- Phone discussion of problem followed by use of EB staff and outside resources - (individual in large and/or small firms having successfully solved the state problem); phoned response to client to convey recommended solution(s).
- Any of the above plus a referral to one or more vendors requesting contact of the client concerning the specific problem.

In certain cases, it may be necessary or desirable for an EB staff member (from a state or the central office) to visit the client's plant to provide more direct, detailed assistance. In other instances, the most effective assistance may involve referral of the client and problem to an engineering consultant.

In practice, the state energy offices may serve as a "branch office" of the EB, accepting client inquiries and providing responses. In these instances, information relating to the client, his problem, information provided as the EB response and follow-up actions planned or suggested will be reported to the central office to provide a basis for further action or reference should the client request additional assistance. This will also assure that the analytical and evaluative aspects of the program will be satisfied.

It should be noted that all inquiries from and information provided to clients will be logged in the computer and referenced. This will afford easy access to background for follow-up and evaluation pruposes and to develop perspective regarding the spectrum of energy conservation problems encountered in the small business community. All client contacts will be handled in a professional and confidential manner, and clients will be made aware that vendor referral is an integral part of the service. Vendors will be referred to clients with emphasis on the closest match between the client's problem and provider's products/services and on a geographical proximity.

CLIENT/VENDOR ACTION

Vendors of energy products or services will be listed and recommended by EB staff to its clients with the stipulation that the vendor inform the program of action taken and results achieved. A simple reporting form will be used to record the outcome and the initial contact, action recommended and/or taken and follow-up planned by the vendor.

TRACKING/FEEDBACK AND FOLLOW-UP

Two levels of feedback will be built into the system. First, the vendor feedback described above will be virtually assured since additional client referrals will not be made without contact reports from the vendor. Each vendor will be tracked through contact with the client to determine the assistance provided and degree of client satisfaction. Complaints of unsatisfactory performance will be relayed to the vendor and a pattern of poor performance will result in the vendor being dropped from EB listings.

The tracking and feedback of client action and client-vendor interaction is designed to assure that a firm receiving specific recommendations as a result of interaction with EB keeps moving toward an energy-conserving solution, no matter how large or small. While this aspect of the EB approach has a certain "hand-holding" flavor to it, experience has shown that forward motion often requires occasional input of outside energy to maintain momentum.

This follow-up function will be carried out as a major initiative of the EB staff in order that alternative recommendations may be made to the client where initial ones failed. New recommendations will be derived by the full application of the client inquiry-EB response process.

PROGRAM EVALUATION

Continuous and thorough evaluation of EB operations and results is essential to its initial and long-term success. An Advisory Council will be established at the program's inception, with members drawn from federal and state government (including those agencies funding the program), private industrial and commercial firms, and associations. Its functions will range from organizational and coordinating aspects, as previously suggested herein, to evaluation of EB's success in achieving its stated objectives. While the Advisory Council will not as a group or as individuals conduct the ongoing evaluation, it will be the Council's responsibility to see that an evaluation team is established or the function provided by contract. The evaluation activity will report to EB through the Advisory Council.

CONCLUSION

A variety of personnel and resources will be required to make the EB work. Its technical experts will reside not only at the state energy offices and the central office, but also at the Department of Energy and its laboratories, in professional an trade associations, at universities, in large and small firms willing to participate in information sharing and in the firms engaged in selling energy-conserving products and services. The EB is seen as a badly needed networking approach aimed at bringing these various sources of expertise together in a focused, coordinated, systematic manner.

ATTACHMENT 1

Northern Energy Corporation
Northeast Solar Energy Center

THUMBNAIL SKETCH OF NORTHEAST REGION

General Energy Posture/Dependence Upon Oil
(Rounded and Typical)

	Population (000's)	% U.S.	Total Energy Demand B/DOE[1] (000's)	% Petroleum	Petroleum Volume B/D[1] (000's)	% Imports	Imports B/D[1] (000's)	Cost of Imports @ $32 Barrel (000's)
Connecticut	3,114	1.4	397	73	290	87	250	$ 8,000
Maine	1,101	.5	245	53	130	87	115	3,700
Massachusetts	5,767	2.6	736	83	610	87	530	17,000
New Hampshire	901	.4	135 [2]	66	90	87	80	2,600
Rhode Island	927	.4	110 [3]	66	73	87	64	2,000
Vermont	498	.2	73	61	45	87	40	1,300
New England Total	12,308	5.5	1,700	73	1,240	87	1,100	$35,000
New Jersey	7,345	3.3	970 [4]	68	660	65	430	$ 13,800
New York	17,576	7.9	2,100	68	1,400	70	1,000	32,000
Pennsylvania	11,707	5.3	2,160	41	885	36	320	10,000
Northeast Totals	48,936	22.1	6,900	61	4,200	66	2,800	$ 90,000
USA Totals	221,530		38,600	47	18,400	47	8,600	$275,000
Northeast to U.S.	22.1%		17.9%		22.8%		32.6%	32.6%

1 B/DOE = Barrels per day oil equivalents; B/D = Barrels per day.
2 New Hampshire "imports" 26.3% of its electrical requirements.
3 Rhode Island "imports" 87.7% of its electrical requirements.
4 New Jersey "imports" 41% of its electrical requirements.

Source: Extrapolations from DOE, EIA and State Data

NESEC IA "NE"
RWM 7/80

UNITED STATES

I. Total Energy Demand: 38,600,000 B/DOE[1]

Oil Volume and Percent of Total: 18,400,000 B/D[1] - 47%

Oil Volume and Percent Imported: 8,600,000 B/D[1] - 47%

II. Transfer Out/Export of Real Income: (Oil @ $32/Barrel) 8,600,000 B[1] x $32 = $275,000,000 Daily (1978 Rate)

Note: 7,100,000 x $32 = $222,000,000 (1980 1st half)

III. Energy Use Mix Percent by Sector:

	TOTAL	OIL	GAS	COAL	ELECT[3]	NUCLR	HYDRO	SOLAR[4]	TOTALS
Residential	20.9	20.7	30.5	0.6	48.2	-----	-----	-----	100
Commercial	16.0	28.3	21.0	1.3	49.4	-----	-----	-----	100
Industrial	36.7	25.2	29.9	11.9	32.9	-----	-----	-----	100
Transportation	26.4	97.3	2.6	----	0.1	-----	-----	-----	100
Electric Utilities[2]	-----	16.2	14.0	43.6	-----	12.6	13.3	0.3	100
	100.0								
Consumption by Energy Type:		47.0	26.6	18.4	-----	3.9	4.1	-----	100

[1]B = Barrel; B/D = Barrel per Day; B/DOE = Barrels per Day Oil Equivalent

[2]30.1% of total energy is electricity and is included in the other end use sectors.

[3]Includes electrical energy losses in the generation and transmission of electricity.

[4]"Solar" includes geothermal, wood and waste.

Sources: Extrapolations from EIA (DOE), DOA, State Data

RWM 7/80
NESEC 12B "NE"

Northern Energy Corporation
Northeast Solar Energy Center

NEW ENGLAND

I. Total Energy Demand: 1,700,000 B/DOE[1]

Oil Volume and Percent of Total: 1,240,00X B/D[1] - 73%

Oil Volume and Percent Imported: 1,100,000 B/D[1] - 87%

II. Transfer Out/Export of Real Income: 1,100,000 B[1] x $32 = $35,000,000 Daily
(Oil @ $32/Barrel)

III. Energy Use Mix Percent by Sector:

	TOTAL	OIL	GAS	COAL	ELECT[3]	NUCLR	HYDRO	SOLAR[4]	TOTALS
Residential	27.4	45.2	14.9	----	34.9	-----	-----	5.0	100
Commercial	23.1	53.6	9.2	----	37.2	-----	-----	-----	100
Industrial	24.9	42.3	6.1	0.3	30.1	-----	1.5	19.7	100
Transportation	24.6	99.7	----	0.2	0.1	-----	-----	-----	100
Electric Utilities[2]	-----	54.8	0.1	2.4	-----	34.9	7.8	-----	100
	100.0								
Consumption by Energy Type:		73.4	7.9	0.9	-----	8.9	2.4	6.5	100

[1]B = Barrel; B/D = Barrel per Day; B/DOE = Barrels per Day Oil Equivalent

[2]25.2% of total energy is electricity and is included in the other end use sectors.

[3]Includes electrical energy losses in the generation and transmission of electricity.

[4]"Solar" includes "biomass". This category represents primarily energy from wood.

Sources: Extrapolations from EIA (DOE), DOA, State Data

RWM 7/80
NESEC 2B "NE"

Northern Energy

CONNECTICUT

I. Total Energy Demand: 397,000 B/DOE[1]

Oil Volume and Percent of Total: 290,000 B/D[1] - 73%

Oil Volume and Percent Imported: 250,000 B/D[1] - 87%

II. Transfer Out/Export of Real Income: 250,000 B[1] x $32 = $8,000,000 Daily
(Oil @ $32/Barrel)

III. Energy Use Mix Percent by Sector:

	TOTAL	OIL	GAS	COAL	ELECT[3]	NUCLR	HYDRO	SOLAR[4]	TOTALS
Residential	30.3	43.1	13.1	----	38.9	-----	-----	4.9	100
Commercial	18.7	36.4	11.4	----	52.2	-----	-----	-----	100
Industrial	25.5	57.0	8.2	----	33.3	-----	-----	1.5	100
Transportation	25.5	100.0	----	----	-----	-----	-----	-----	100
Electric Utilities[2]	-----	46.4	----	0.1	-----	53.2	1.3	-----	100
	100.0								
Consumption by Energy Type:		72.9	6.9	----	-----	17.9	0.5	1.8	100

[1]B = Barrel; B/D = Barrel per Day; B/DOE = Barrels per Day Oil Equivalent

[2]34.9% of total energy is electricity and is included in the other end use sectors.

[3]Includes electrical energy losses in the generation and transmission of electricity.

[4]"Solar" includes "biomass". This category represents primarily energy from wood.

Sources: Extrapolations from EIA (DOE), DOA, State Data

RWM 7/80
NESEC 68 "NE"

Northern Energy Corporation

MAINE

I. Total Energy Demand: 245,000 B/DOE[1]

Oil Volume and Percent of Total: 130,000 B/D[1] - 53%

Oil Volume and Percent Imported: 115,000 B/D[1] - 87%

II. Transfer Out/Export of Real Income: 115,000 B[1] x $32 = $3,700,000 Daily
(Oil @ $32/Barrel)

III. Energy Use Mix Percent by Sector:

	TOTAL	OIL	GAS	COAL	ELECT[3]	NUCLR	HYDRO	SOLAR[4]	TOTALS
Residential	19.6	54.7	1.0	----	33.7	-----	-----	10.6	100
Commercial	13.3	66.7	1.5	----	31.8	-----	-----	-----	100
Industrial	47.0	27.0	0.3	0.2	15.9	-----	4.3	52.3	100
Transportation	20.1	100.0	----	----	-----	-----	-----	-----	100
Electric Utilities[2]	-----	10.7	----	----	-----	51.8	37.5	-----	100
	100.0								
Consumption by Energy Type:		52.6	0.5	0.1	-----	11.1	10.1	25.6	100

[1]B = Barrel; B/D = Barrel per Day; B/DOE = Barrels per Day Oil Equivalent

[2]22.4% of total energy is electricity and is included in the other end use sectors.

[3]Includes electrical energy losses in the generation and transmission of electricity.

[4]"Solar" includes "biomass". This category represents primarily energy from wood.

Sources: Extrapolations from EIA (DOE), DOA, State Data

RWM 7/80
NESEC 78 "NE"

Northern Energy Corporation

MASSACHUSETTS

I. Total Energy Demand: 736,000 B/DOE[1]

Oil Volume and Percent of Total: 610,000 B/D[1] - 83%

Oil Volume and Percent Imported: 530,000 B/D[1] - 87%

II. Transfer Out/Export of Real Income: 530,000 B[1] x $32 = $17,000,000 Daily
(Oil @ $32/Barrel)

III. Energy Use Mix Percent by Sector:

	TOTAL	OIL	GAS	COAL	ELECT[3]	NUCLR	HYDRO	SOLAR[4]	TOTALS
Residential	27.9	43.8	21.2	----	32.0	-----	-----	3.1	100
Commercial	30.1	56.2	10.3	----	33.5	-----	-----	-----	100
Industrial	16.3	46.1	10.7	0.8	39.9	-----	0.4	2.1	100
Transportation	25.7	99.8	0.1	----	0.1	-----	-----	-----	100
Electric Utilities[2]	-----	82.9	0.4	----	-----	16.2	0.5	----	100
	100.0								
Consumption by Energy Type:		83.4	10.9	0.1	-----	4.1	0.2	1.3	100

[1]B = Barrel; B/D = Barrel per Day; B/DOE = Barrels per Day Oil Equivalent

[2]24.9% of total energy is electricity and is included in the other end use sectors.

[3]Includes electrical energy losses in the generation and transmission of electricity.

[4]"Solar" includes "biomass". This category represents primarily energy from wood.

Sources: Extrapolations from EIA (DOE), DOA, State Data

RWM 7/80
NESEC 88 "NE"

NEW HAMPSHIRE

I. Total Energy Demand: 135,000 B/DOE[1] (including electricity "imports")

Oil Volume and Percent of Total: 90,000 B/D[1] - 66%

Oil Volume and Percent Imported: 80,000 B/D[1] - 87%

II. Transfer Out/Export of Real Income: 80,000 B[1] x $32 = $2,600,000 Daily
(Oil @ $32/Barrel)

III. Energy Use Mix Percent by Sector:

	TOTAL	OIL	GAS	COAL	ELECT[3]	NUCLR	HYDRO	SOLAR[5]	TOTALS
Residential	27.4	48.7	5.3	----	38.1	-----	-----	7.9	100
Commercial	14.8	63.4	7.3	----	29.3	-----	-----	-----	100
Industrial	34.7	33.8	1.0	----	28.5	-----	2.0	34.7	100
Transportation	23.1	100.0	----	----	-----	-----	-----	-----	100
Electric Utilities[2]	-----	29.1	----	29.8	26.3[4]	-----	14.8	-----	100
	100.0								
Consumption by Energy Type:		64.6	2.9	7.3	6.8[4]	-----	4.3	14.1	100

[1] B = Barrel; B/D = Barrel per Day; B/DOE = Barrels per Day Oil Equivalent

[2] 18.1% of total energy is electricity and is included in the other end use sectors.

[3] Includes electrical energy losses in the generation and transmission of electricity.

[4] Electricity sales exceed electric utility energy consumption. New Hampshire "imports" 26.3% of its electricity supply. This equals 6.8% of total energy demand.

[5] "Solar" includes "biomass". This category represents primarily energy from wood.

Sources: Extrapolations from EIA (DOE), DOA, State Data

RWM 7/80
NESEC 98 "NE"

Northern Energy Corporation
Northeast Solar Energy Center

RHODE ISLAND

I. Total Energy Demand: 110,000 B/DOE[1] (including electricity "imports")

Oil Volume and Percent of Total: 73,000 B/D[1] - 66%

Oil Volume and Percent Imported: 64,000 B/D[1] - 87%

II. Transfer Out/Export of Real Income: 64,000 B[1] x $32 = $2,000,000 Daily
(Oil @ $32/Barrel)

III. Energy Use Mix Percent by Sector:

	TOTAL	OIL	GAS	COAL	ELECT[3]	NUCLR	HYDRO	SOLAR[5]	TOTALS
Residential	30.0	43.9	21.2	----	31.8	-----	-----	3.1	100
Commercial	26.9	55.9	8.5	----	35.6	-----	-----	-----	100
Industrial	18.6	47.5	11.9	0.2	38.0	-----	-----	2.4	100
Transportation	24.5	99.9	----	----	0.1	-----	-----	-----	100
Electric Utilities[2]	-----	12.2	----	----	87.7[4]	----	0.1	-----	100
	100.0								
Consumption by Energy Type:		65.5	10.6	----	22.6[4]	-----	-----	1.3	100

[1]B = Barrel; B/D = Barrel per Day; B/DOE = Barrels per Day Oil Equivalent

[2]30.4% of total energy is electricity and is included in the other end use sectors.

[3]Includes electrical energy losses in the generation and transmission of electricity.

[4]Electricity sales exceed electric utility energy consumption. Rhode Island "imports" 87.7% of its electricity supply. This equals 22.6% of total energy demand.

[5]"Solar" includes "biomass". This category represents primarily energy from wood.

Sources: Extrapolations from EIA (DOE), DOA, State Data

RWM 7/80
NESEC 108 "NE"

Northern Energy Corporation
Northeast Solar Energy Center

VERMONT

I. Total Energy Demand: 73,000 B/DOE[1]

Oil Volume and Percent of Total: 45,000 B/D[1] - 61%

Oil Volume and Percent Imported: 40,000 B/D[1] - 87%

II. Transfer Out/Export of Real Income (Oil @ $32/Barrel): 40,000 B[1] x $32 = $1,300,000 Daily

III. Energy Use Mix Percent by Sector:

	TOTAL	OIL	GAS	COAL	ELECT[3]	NUCLR	HYDRO	SOLAR[4]	TOTALS
Residential	29.0	46.5	2.3	0.1	41.8	-----	-----	9.3	100
Commercial	18.2	59.2	3.7	0.1	37.0	-----	-----	-----	100
Industrial	27.1	47.5	5.0	0.2	32.5	-----	2.3	12.5	100
Transportation	25.7	100.0	----	----	----	-----	-----	-----	100
Electric Utilities[2]	-----	----	----	----	-----	76.2	21.9	1.9	100
	100.0								
Consumption by Energy Type:		61.4	2.6	0.1	-----	23.1	6.8	6.0	100

[1]B = Barrel; B/D = Barrel per Day; B/DOE = Barrels per Day Oil Equivalent

[2]30.4% of total energy is electricity and is included in the other end use sectors.

[3]Includes electrical energy losses in the generation and transmission of electricity.

[4]"Solar" includes "biomass". This category represents primarily energy from wood.

Sources: Extrapolations from EIA (DOE), DOA, State Data

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NESEC 11B "NE"

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Northeast Solar Energy Center

ATTACHMENT 2

PRICE OF ENERGY TO THE END USER IN NEW ENGLAND
AND IN THE UNITED STATES
(EXCLUSIVE OF TAXES)

	NE ($/M BTU)	US ($/M BTU)	NE HIGHER THAN THE US ($/M BTU)	NE HIGHER THAN THE US (%)
1970	1.79	1.40	.39	+27.7%
1971	1.96	1.52	.44	+29.0%
1972	2.01	1.57	.44	+27.6%
1973	2.29	1.73	.56	+32.5%
1974	3.51	2.53	.98	+38.9%
1975	3.94	3.01	.93	+30.9%
1976	4.06	3.22	.84	+26.0%
1977	4.47	3.64	.83	+22.7%
1978	4.67	3.98	.69	+17.3%
1979	6.16	4.88	1.28	+26.2%
1980	8.71	6.41	2.30	+35.9%

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ATTACHMENT 3

FUEL/ENERGY COSTS PER MMBTU

FUEL	UNIT	PRICE	EFF.	COST OF USABLE HEAT/ MMBTU
#2 Heating Oil	Gal. (138,000 BTU)	$ 1.40	65%	$ 15.60
Eastern Coal (Anthracite)	Ton (13,000 BTU/LB)	$90	65%	5.12
		$140	"	7.97
Western Coal (Bituminous)	Ton (9,000 BTU/LB)	$40	75%	2.96
		$60	"	4.44
Natural Gas	Therm	$0.40	80%	5.00
	"	$0.60	"	7.50
Electricity	KWH (3,415 BTU)	$0.05	95%	15.42
		$0.07	"	21.95
Firewood	Cord (25, MMBTU)	$ 70	45%	6.21
		$100	"	8.88
Wood Pellets	Ton (8,000 BTU/LB)	$65	65%	6.25
		$95	"	9.15
Wood Chips (45%MC)	Ton (4,700 BTU/LB)	$16	60%	3.06
		$24	"	4.95

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ATTACHMENT 4

SOLAR INDEX

AVERAGE READINGS 1979 & 1980

HARTFORD, CT	62.4	KANSAS CITY, MO
PORTLAND, ME	61.7	ST. PAUL, MN
BOSTON, MA	65.0	SAN DIEGO, CA
CONCORD, NH	66.1	MONTGOMERY, AL
TRENTON, NJ	64.3	SALT LAKE CITY, UT
NEW YORK, NY	67.4	CHEYENNE, MO
BINGHAMTON, NY	61.7	HOUSTON, TX
PHILADELPHIA, PA	63.0	DURHAM, NC
PITTSBURG, PA	59.8	DES MOINES, IA
PROVIDENCE, RI	69.9	TAMPA, FL
BURLINGTON, VT	56.2	LOS ANGELES, CA

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ATTACHMENT 5

A JUDGMENTAL ESTIMATE OF RENEWABLE ENERGY EMPLOYMENT OPPORTUNITIES THRU 2000

ROBERT W. MITCHELL
PAPER DATED: MAY 5, 1981

NORTHEAST SOLAR ENERGY CENTER
A Division of
NORTHERN ENERGY CORPORATION
470 ATLANTIC AVENUE
BOSTON, MASSACHUSETTS 02110

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NOTE: Also attached is EXHIBIT 5 - analysis of NEW ENGLAND. 20, 21, 22

Similar analyses for each of the Nine Northeastern states are availabe upon request. Forward requests to:

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A JUDGMENTAL ESTIMATE OF RENEWABLE ENERGY EMPLOYMENT OPPORTUNITIES THRU 2000

ABSTRACT

By 1985 the industrialization of proven solar technologies can create 100,000 new jobs, reduce our dependence on imported oil by 150,000 barrels per day and stimulate the Northeast's economy by more than $10 Billion during that year.

Employment opportunities in the industrialization of renewable energy applications in the Northeast Region are boundless. "Here and now" solar methods can complement the expansion of centralized energy delivery systems. This socially appealing energy mix, i.e. "centralized" and "decentralized" decision making and so-called "conventional" and "renewables", can defuse the energy option "either/or" debates and can cause acceleration in the correction of our poor energy posture.

A general theme could be "Import a Barrel, Export a Job". At today's costs an imported barrel a day carries an annual burden of $13,000 taken and exported from our savings, our real income, and our local economy. This barrel of oil not imported has the same value whether its use-avoidance is the result of improved energy management (conservation) or the expansion of nuclear, coal, hydro, wood (biomass) and other proven solar applications.

Our basic energy problem is our heavy and debilitating dependence on imported oil. Centralized and individual energy planning should consider the impact of their contemplated energy action on the reduction of this dependency. Our opportunities are multiple.

This Judgmental Estimate suggests the United States aggregate all viable energy options and create an investment climate that will encourage the formation of energy capital competitively.

INTRODUCTION

Employment opportunites have been projected in the energy field variously and specific to the construction and operation of individual categories of manufacturing and transportation facilities. Each study, with conclusions representing vested interests, favors individually a big fix as the energy panacea. The "energy option" debates are unrelenting. Each recognizes the major element of the national energy problem as being our heavy dependence upon world market sources of oil. The arguments, considered in isolation, are convincing; for example:

- o Improved energy management alone "is the answer".
- o Concentration on renewable energy resources will elminate our dependence upon the world market for energy supplies.
- o The United States' coal reserve is our answer to Arab OPEC.
- o We have enough natural gas to meet all of our energy needs for the foreseeable future; or
- o "Don't worry, we don't have an energy problem. There is plenty of oil in world to see us easily through the year 2030".

The 1980 elections provided clear evidence that the American consumers are dissatisfied with the past scheme of things, particularly the ineffectiveness of our National Energy Policy. The consumer demands a change. The continuing energy cost escalation is the basic contributing factor to this dissatisfaction. There is growing consumer interest in the process with which centralized energy decisions have and continue to be made regarding oil, gas and electric distribution.

Consumer attitudinal trends are emerging that require his being an integral part of the decision making process. This trend is manifesting itself also in individual, decentralized energy decisions, i.e. the homeowner's use of wood, passive solar, domestic solar water heating, etc. There is an exigent need for all the various types of energy-related, viable investments being discussed and considered; this includes the development of the renewable energy resources that abound in the Northeast Region and, indeed, in the entire nation.

The consumer, large and small, must be encouraged to evaluate the competitive energy opportunities offered by renewable energy resources and to determine the degree to which he wishes to avail himself of the financial incentives in the utility of centralized and decentralized energy options in his energy mix. Decentralized options could be in many forms such as the logic of a decision to burn wood in a stove in a home, to burn wood chips in a power plant or wood pellets in a small business, to space heating with passive technologies, to heat water with active solar systems, to generate electricity with a windmill, to heat process liquids with solar, to incorporate photovoltaic cells in the satisfaction of some of the electricity demand in residences, in business, industry and in the generation of electricity.

GENERAL CONCLUSION REGARDING ENERGY MIX TRENDS

The most optimistic and highly popular energy supply/demand balance outlook considers high conservation, low growth and renewable energy emphasis. It provides also for a significant expansion of hydro capabilities, encourages a more than doubling of our coal production and utilization and it foresees a quadrupling of our nuclear generating capacity. This projection (Exhibit 1, 1 Page) indicates by the year nation would be domestic energy supply deficient by the equivalent of 4.5 million barrels of oil a day or nearly 10% of our total energy demand. This is not a satisfactory case for consideration as the nation's energy policy or energy plan. This scenario projects renewable energy (including hydro) meeting approximately 19% of the nation's total energy demand.

This same scenario applied to the Northeast region (Exhibit 2, 2 Pages) with hydro, biomass and solar meeting 25% of the region's total energy demand would result in a supply deficiency of over 11% of the Region's total energy demand or 0.9 million barrels of oil daily. This scenario is inadequate. We, as a region, must endeavor to accelerate the industrialization of alternative energy opportunities and accept the challenge of accomplishing the reduction of our dependence upon imported oil to a 11% level by 1990 instead of the year 2000.

Similarly, New England (Exhibit 3, 2 Pages) would find itself at year 2000 with an energy supply deficiency of almost 36%. New England depends upon oil to satisfy 80% of its energy demand; 87% of its oil supplies originate in the world market. New England's economy could not survive such an option. It must reduce its dependence upon world market oil from 64% to 36% during the next ten years. This is a tremendous

task. It cannot and will not be achieved unless New England, the Northeast Region and, indeed, the federal government create a good, energy investment climate at the local, state, regional and national levels. Energy capital will form in a proper risk environment.

There should be continuing, indigenous energy industrialization to ensure a strong and flexible energy mix. All of this in the interest of our national security, the maintenance and strengthening of our economic vitality and viability, our competitive posture in the family of nations and our world leadership.

The critical period is between now and 1985 in gaining the momentum necessary to achieve increasingly the desired energy market penetration and employment levels projected not only for renewable energies but also the separate projections for non-renewables.

Looking at the potential renewable energy resource (solar) option in isolation, its contribution to the region's economic recovery is impressive. (Exhibit 4, Northeast Region, Pages I, II and III).

	1980	1985	1990	2000
I. Employment - Manyears Direct, Only	17,500	67,500	126,500	400,000
II. Market Penetration (Thousand Bls/Day Oil Equiv.)	175KB	330KB	560KB	1500KB
III. Solar Unit Goals By Economic Sector and Individual Technology, See Details.				

By 1985 assuming the renewable energy resources are utilized the Northeast Region's economy will have experienced an expanded employment base of 100,000 jobs (manyears) both direct and indirect. Also in 1985 a net infusion of $10 Billion in its economy is entirely possible. (155,000 B/D x $45 x 365 plus threefold ripple.) Induced labor and economic activity have not been considered in this estimate.

EXHIBIT 1

U.S. ENERGY SUPPLY/DEMAND BALANCE

Historical and Forecast
High Conservation, Low Growth, Alternate Energy Emphasis

Year	1970 (5% Growth)	(%)	1978 (2% Growth)	(%)	1985 (0.3% Growth)	(%)	2000 (1.1% Growth)	(%)
	MM/BBL DAY OIL EQUIVALENTS							
Demand Total:	33.6	(100)	39.3	(100)	40.1	(100)	47.1	(100)
Supply (Domestic)								
Oil	11.3	(33.6)	10.2	(26.0)	8.4	(21.0)	7.4	(15.5)
Gas	10.5	(31.0)	9.5	(24.0)	7.4	(18.5)	5.9	(12.5)
Hydro	1.3	(4.0)	1.6	4.0	1.7	(4.5)	2.1	(4.5)
Renewable	0.5	(1.5)	0.9	2.0	1.3	(3.0)	6.7	(14.5)
Coal	6.3	(19.0)	7.0	18.0	8.9	(22.0)	14.8	(31.5)
Nuclear	0.1	----	1.5	4.0	3.0	(7.5)	5.9	(12.5)
Domestic Supply Total:	30.0	(89.1)	30.6	(78.0)	30.7	(76.5)	42.8	(91.0)
Supply Shortfall:	3.6	(10.9)	8.7	(22.0)	3.0	(23.5)	4.3	(9.0)
Required Imports								
Oil	3.3	(10.0)	8.3	(21.0)	8.4	(21.0)	3.0	(6.4)
Gas	0.3	(0.9)	0.4	(1.0)	1.0	(2.5)	1.3	(2.6)
Import Totals:	3.6		8.7		9.4		4.3	

Source: DOE-EIA, DOE, various

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NORTHEAST REGION

EXHIBIT 1, PAGE 1

Energy Supply/Demand Balance (Gross Energy Mix) 1978-2000

High Conservation, Low Growth, Solar Technology Emphasis

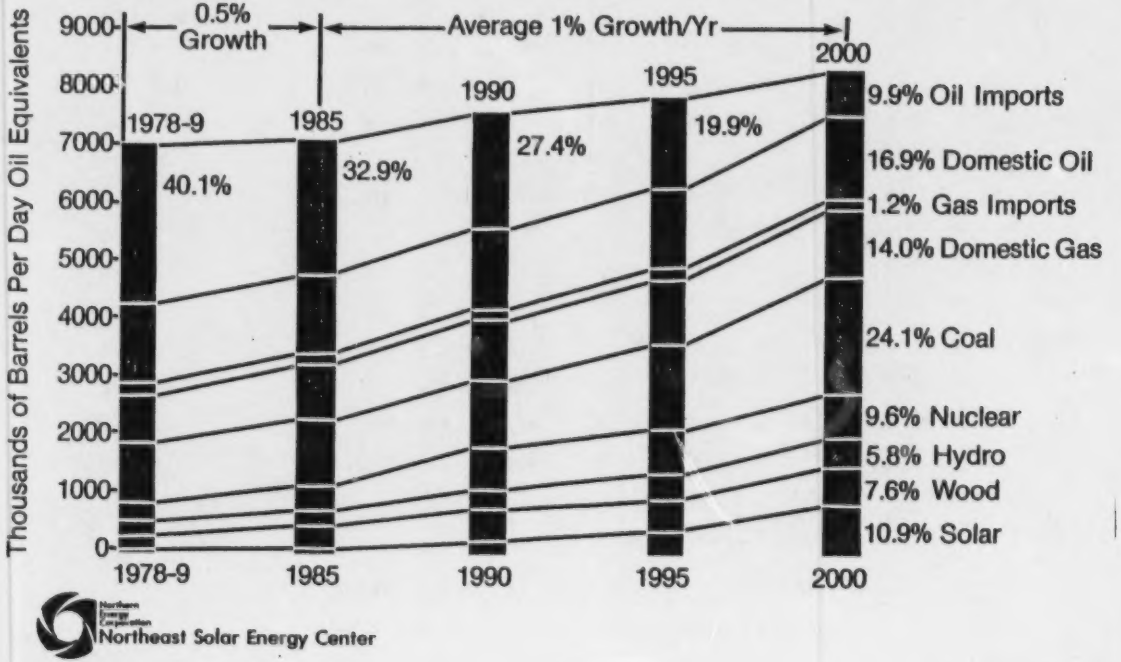
Year (Growth):	THOUSANDS OF BARRELS/DAY OIL EQUIVALENTS									
	1978 (2.0%)		1985 (0.5%)		1990 (1.0%)		1995 (1.0%)		2000 (1.0%)	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%
Demand B/DOE (000's):	6,900	(100)	7,150	(100)	7,515		7,900		8,300	(100)
Supply (Domestic):	4,095	(59.2)	4,690	(65.9)	5,360	(71.3)	6,230	(78.9)	7,380	(88.9)
Oil	1,415	(20.6)	1,400	(19.6)	1,400	(18.6)	1,400	(17.7)	1,400	(16.9)
Gas	845	(12.2)	1,000	(14.0)	1,050	(14.0)	1,100	(14.0)	1,160	(14.0)
Coal	990	(14.3)	1,100	(15.3)	1,300	(17.2)	1,600	(20.2)	2,000	(24.1)
Nuclear	435	(6.3)	520	(7.3)	610	(8.1)	700	(8.9)	800	(9.6)
Hydro	210	(3.0)	220	(3.1)	300	(4.0)	380	(4.8)	485	(5.8)
Wood	200	(2.8)	400	(5.6)	500	(6.7)	600	(7.6)	630	(7.6)
Solar	---		50	(1.0)	200	(2.7)	450	(5.7)	905	(10.9)
Domestic Supply Total:	4,095	(59.2)	4,690	(65.9)	5,360	(71.3)	6,230	(78.9)	7,380	(88.9)
Supply Shortfall:	2,805	(40.8)	2,460	(34.1)	2,155	(28.7)	1,670	(21.1)	920	(11.1)
Imports										
Oil	2,760	(40.1)	2,370	(32.9)[1]	2,055	(27.4)[1]	1,570	(19.9)[1]	820	(9.9)[1]
Gas	45	(0.7)	90	(1.2)[1]	100	(1.3)[1]	100	(1.2)[1]	100	(1.2)[1]
Import Totals:	2,805	(40.8)	2,460	(34.1)	2,155	(28.7)	1,670	(21.1)	920	(11.1)

[1] Coal, peat and wood gasification and/or liquefaction can reduce this forecast import requirement.

Source: DOE-EIA
L. Levy - NESEC Study

NESEC--9A
RWH 8/80

Northeast Region
Gross Energy Mix - Energy Supply/Demand Balance
High Conservation, Low Growth, Solar Technology Emphasis



Northeast Solar Energy Center

NEW ENGLAND

EXHIBIT 3, PAGE 1

Energy Supply/Demand Balance (Gross Energy Mix) 1978-2000

High Conservation, Low Growth, Solar Technology Emphasis

Year (Growth):	THOUSANDS OF BARRELS/DAY OIL EQUIVALENTS									
	1978/79 (-0.4%)		1985 (0.5%)		1990 (1.0%)		1995 (1.0%)		2000 (1.0%)	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%
Demand B/DOE (000's):	1,700	(100)	1,760	(100)	1,850	(100)	1,945	(100)	2,045	(100)
Supply (Domestic):	606	(35.6)	785	(44.6)	963	(52.0)	1,121	(57.6)	1,310	(64.1)
Oil	163	(9.5)	160	(9.1)	160	(8.6)	160	(8.2)	160	(7.8)
Gas	126	(7.4)	130	(7.4)	133	(7.2)	136	(7.0)	140	(6.8)
Coal	15	(0.9)	50	(2.8)	90	(4.9)	135	(7.0)	160	(7.8)
Nuclear	151	(8.9)	180	(10.2)	210	(11.3)	210	(10.8)	210	(10.3)
Hydro	40	(2.4)	50	(2.8)	70	(3.8)	90	(4.6)	110	(5.4)
Wood	111	(6.5)	200	(11.4)	260	(14.0)	300	(15.4)	330	(16.1)
Solar	-----		15	(0.9)	40	(2.2)	90	(4.6)	200	(9.8)
Domestic Supply Total:	606	(35.6)	785	(44.6)	963	(52.0)	1,121	(57.6)	1,310	(64.1)
Supply Shortfall:	1,094	(64.4)	975	(55.4)	887	(48.0)	824	(42.4)	735	(35.9)
Oil	1,086	(63.9)	960	(54.5)[1]	860	(46.5)[1]	792	(40.7)[1]	700	(34.2)[1]
Gas	8	(0.5)	15	(0.9)[1]	27	(1.5)[1]	32	(1.7)[1]	35	(1.7)[1]
Import Totals:	1,094	(64.4)	975	(55.4)	887	(48.0)	824	(42.4)	735	(35.9)

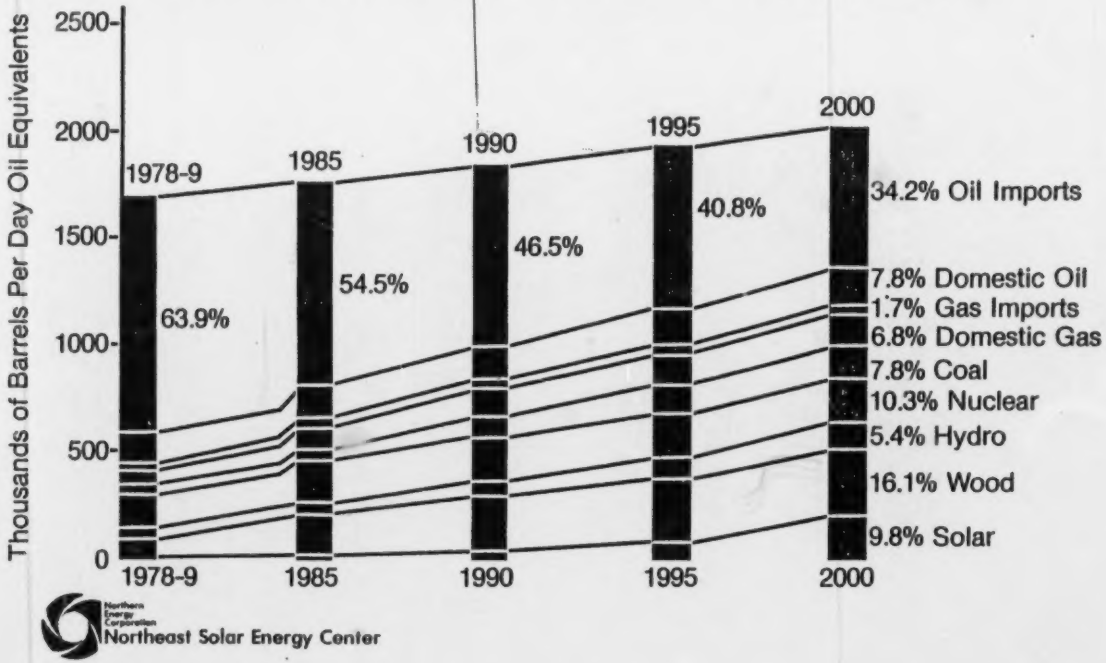
[1] Coal, peat and wood gasification and/or liquefaction can reduce this forecast import requirement.

Source: DOE-EIA
L. Levy - NESEC Study

NESEC--10A
RWM 8/80

-6-

New England
Gross Energy Mix - Energy Supply/Demand Balance
High Conservation, Low Growth, Solar Technology Emphasis



Northern Energy Corporation
Northeast Solar Energy Center

EXHIBIT 4, PAGE 1

NORTHEAST REGION
(NJ, NY PA AND NEW ENGLAND)

I. SOLAR RELATED EMPLOYMENT OUTLOOK, DIRECT LABOR ONLY

	1980	1985	1990	1995	2000
BUILDINGS SYSTEMS					
Active	322	16,383	24,871	51,734	113,279
Passive	5,078	7,245	18,492	30,815	61,879
Firewood	6,070	21,200	27,300	31,700	34,600
Photovoltaics	--	2,800	5,310	7,549	13,440
Wind	250	1,148	3,444	7,460	6,061
Subtotal	11,720	42,706	73,347	124,191	222,989
Say	11,000	41,000	70,000	120,000	210,000
ELECTRIC SYSTEMS					
Biomass	6,921	11,107	15,882	19,678	23,037
Wind	195	2,056	8,037	16,570	41,465
Photovoltaics	--	1,467	7,760	10,539	19,277
Subtotal	7,116	14,630	31,679	46,787	83,779
Say	6,500	13,500	30,000	45,000	80,000
INDUSTRY SYSTEMS					
Industrial Process Heat	--	13,000	26,000	58,000	110,000
Subtotal	--	13,000	26,000	58,000	110,000
GRAND TOTAL	17,500	67,500	126,000	223,000	400,000
(Delta)	(------)	(50,000)	(58,500)	(97,000)	(177,000)

Conversions of "Solar Units" to Direct Labor

BUILDINGS

- Active — Previous "Units" - 5 x 0.172 = Direct Man Years
- Passive — Previous "Units" - 5 x 0.069 = " " "
- Wood — Current "Units" - (50% x 1980 Units) x 2 = Direct M. Yr.
- Photovoltaics — Previous "Units" - 5 x 0.19 = Direct Man Years
- Wind — Previous "Units" - 5 x 2.67 = " " "

ELECTRIC SYSTEMS

- Biomass — Current "Units" x 0.66 x 0.39 = Direct Man Years
- Wind — Previous "Units" - 5 x 2.67 = " " "
- Photovoltaics — Previous "Units" - 5 x 0.19 = " " "

INDUSTRIAL SYSTEMS

- Industrial Process Heat — Previous "Units" - 5 x 1.58 = Direct Man Years

NORTHEAST REGION
(NJ, NY PA AND NEW ENGLAND)

II. Solar Energy Market Penetration Goals
(Quantities in Thousand Barrels/Day Oil Equivalents - KB/DOE)

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
- Active	0.1	16.8	42.1	94.7	210
- Passive	4.8	11.6	29.0	58.1	116
- Wood	65.5	114.5	147.2	171.3	186.8
- Photovoltaics	--	1.2	10.9	24.3	48.1
- Wind	0.3	3.0	10.3	26.7	40.0
Subtotal	70.7	147.1	239.5	375.1	600.9
ELECTRIC SYSTEMS					
- Biomass	104.9	168.3	240.7	298.2	349.1
- Wind	0.2	4.7	22.4	58.7	149.4
- Photovoltaics	--	0.7	14.5	33.4	67.9
Subtotal	105.1	173.7	277.6	390.3	566.4
INDUSTRY SYSTEMS					
- Industrial Process Heat	--	10.4	44.0	118.0	260.0
Subtotal	--	10.4	44.0	118.0	260.0
GRAND TOTAL KB/DOE	175.8	331.2	561.1	883.4	1427.3
(Delta)	(--)	(155.4)	(229.9)	(322.3)	(543.9)

Conversions of "Solar Units" to "Barrels/Days" Oil Equivalent.

BUILDING SYSTEMS

- Active	No. of units	x 0.035	=	B/DOE
- Passive	" " "	x 0.013	=	"
- Wood	" " "	x 10.8	=	"
- Photovoltaics	" " "	x 0.068	=	"
- Wind	" " "	x 1.17	=	"

ELECTRIC SYSTEMS

- Biomass	No. of units	x 3.9	=	B/DOE
- Wind	" " "	x 1.17	=	"
- Photovoltaics	" " "	x 0.068	=	"

INDUSTRY SYSTEMS

- Industrial Process Heat	No. of units	x 0.4	=	B/DOE

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EXHIBIT 4, PAGE 3

NORTHEAST REGION
(NJ, NY, PA AND NEW ENGLAND)

III. Unit Goals by Technology - Cumulative, except Wood and Biomass Annualized

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
- Active	3,750	480,000	1,203,000	2,707,000	6,000,000
- Passive	368,000	893,000	2,233,000	4,466,000	8,950,000
- Wood	6,070	10,600	13,650	15,850	17,800
- Photovoltaics	--	18,402	158,150	356,800	710,500
- Wind	280	2,430	8,880	22,850	34,200
ELECTRIC SYSTEMS					
- Biomass	26,890	43,150	61,700	76,450	89,500
- Wind	220	4,070	19,120	50,150	127,800
- Photovoltaics	--	9,650	213,850	491,200	998,500
INDUSTRY SYSTEMS					
- Industrial Process Heat	--	26,000	110,000	295,000	650,000

Short Description of "Units". See also "Description of 'Units' and Assumptions"

BUILDINGS SYSTEMS

- Active — 500 sq. ft. of flat plate or evacuated tube collectors, etc.
- Passive — 200 sq. f.t of solar space, including glazing, etc.
- Wood — 1,000 cords dry, mixed firewood
- Photovoltaics — 1,000 sq. ft. array of PV cells, storage, inverter, etc.
- Wind — 132 KW wind generator, tower, generator, etc. (nominal size)

ELECTRIC SYSTEMS

- Biomass — 1,000 Tons Green Chips
- Wind — 132 KW wind generator, tower, generator, etc.
- Photovoltaics — 1,000 sq. ft. array

INDUSTRY SYSTEMS

- Industrial Process Heat — 5,000 sq. ft. of flat plate or evacuated tube collectors.

METHODOLGY

The Employment, Market Penetration and Solar "Unit" projections in this report (Exhibit 4, Northeast Region 3 Pages) assume that the renewable energy resources of the United States and the Northeast region will be developed on a basis equitable to those of non-renewable, or conventional, energy types. In other words, the financial incentives and encouragement provided by federal and state governments will be comparable for renewable and non-renewable energy resources so as to allow them to interact and compete in the in the marketplace. This being the case by year 2000 the Northeast Region could develop renewable energy resources to displace 1.5 million of oil a day that otherwise would be imported. This is exclusive of 500,000 barrels per day oil equivalent to be displaced by hydro power. The Solar Related Employment Outlook projections indicate 380,000 new, direct labor jobs by virtue of achieving the solar energy penetration levels indicated for year 2000. The bases and assumptions used in developing the Employment (I), Energy Market Penetration (II) and Solar "Unit" (III) projections are explained by economic sector and solar technology with each sector, as follows:

BUILDING SYSTEMS

- Space and Water Heating, Active
- Passive Solar Design, Sunspaces, etc.
- Firewood
- Photovoltaics (solar cells)
- Wind Energy Conversion

POWER SYSTEMS

- Biomass
- Wind Energy Conversion
- Photovoltaics (Solar Cells)

INDUSTRY SYSTEMS

- Industrial Process Heat

These bases and assumptions are as follows:

DESCRIPTIONS OF "UNIT" AND ASSUMPTIONS

I. Buildings - Residential and Commercial

A. Space and Water Heating, Active

- 500 sq. ft. of flat plate or evacuated tube collectors, ancilliary storage, heat exchangers, piping, pumps, fittings and system controls
- Average "unit" cost = $10,000 or $20/sq. ft.
- Average daily "oil savings" = 0.035 B/DOE (Barrels/Day Oil Equivalent)
- Each unit installed requires:

  280 hours of Direct Labor
  258 hours of Indirect Labor
  538 hours of Total Labor

- Each $1 Billion of final demand = 100,000 units
- Each $1 Billion of final demand = 33,000 jobs
- Man years per "unit" = 0.330 total labor or
  0.172 total direct labor and
  0.158 total indirect labor

B. Passive Solar Design, Sunspaces, Etc.

- 200 sq. ft. solar space including, foundations, floor framing, glazing and cover
- Average "unit" cost = $20/sq. ft. or $4,000
- Average daily "oil savings" = 0.013 B/DOE
- Each unit installed requires:

  113 hours of direct labor
  102 hours of indirect labor
  215 hours of total labor

- Each $1 Billion of final demand = 250,000 units
- Each $1 Billion of final demand = 32,935 jobs
- Man years per unit = 0.131 Total Labor; or
  = 0.069 Total Direct Labor; and
  = 0.062 Total Indirect Labor

C. Firewood

- 1,000 cords of dry, mixed firewood
- Average "unit" cost = $85,000 ($85 per cord)
- Average daily "Oil Savings" = 10.8 B/DOE
- Currently 50% of Residential Firewood is "self-cut" or "non-brokered"
- "Non-brokered" volume will remain constant
- Each "Brokered" unit used (from Harvest to consumption) requires:

  50 chainsaw operators

  250 skilled and semi-skilled laborers

  100 truck drivers

- For 200 working days per year, or

  1 man day = 2.5 cords

  500 cords per man per year

  1 cord of firewood = 165 gallons #2 heat oil equivalents

- Each $1 Billion of final demand = 11,764 units of harvest
- Each $1 Billion of final demand = 23,528 jobs
- Man Years per unit = 2.00 direct labor
- Note:

  The above does not include information on:

  1. Manufacture of wood stoves
  2. Manufacture of chain saws, etc.
  3. Chimney construction and stove installation, and
  4. Transportation Equipment

D. Photovoltaics - See II. Power Systems, C.

E. Wind - See II. Power Systems, B.

II. ELECTRIC SYSTEMS

A. Biomass

- 1,000 tons of green chips
- Average "unit" cost = $16,000 ($16 per ton)
- Average Unit Daily Oil Savings = 3.9 B/DOE (60,000 gallons # 2 Heating Oil)
- Fuel used will be 66% green chips and 34% residuals
- Each unit used (from Harvest to Consumption) requires:

  1 driver per 40 tons per day = 8,000 tons year = 0.125 m/yrs

  9 workers per 170 tons per day = 34,000 tons year = 0.265 /yrs

- Each $1 Billion of final demand = 62,500 units of harvest
- Each $1 Billion of final demand = 24, 375 jobs
- Man years per "unit" = 0.39 direct labor
- Note: The above does not include information on

  1. Manufacture, erection and operation of thermal stations/plants;
  2. Manufacture of harvesting equipment; and
  3. Transportation Equipment.

B. Wind Energy Conversion

- Average Capacity (multiples) of 132 KW Wind Generator, including tower foundation, tower, generator, inverter, control equipment, etc.
- Average unit cost = $1,200/KW capacity or $158,400
- Average daily oil savings = 1.17 B/DOE
- Each unit installed requires:

  4,354 hours direct labor
  4,018 hours indirect labor
  8,372 hours of total labor

- Each $1 Billion of final demand = 6,313 units

- Each $1 Billion of final demand = 32,400 jobs

- Man years per unit = 5.13 total labor or
  = 2.67 total direct labor and
  = 2.46 total indirect labor

C. Photovoltaics (Solar Cells)

- 1,000 sq. ft. array of photovoltaic cells, battery storage, an inverter, etc.

- Average "unit" cost = $10,000 in 1985

- Average daily oil savings = 0.068 B/DOE

- Each unit installed requires:

  309 hours of direct labor
  244 hours of indirect labor
  553 hours of total labor

- Each $1 Billion final demand = 100,000 "units"

- Each $1 Billion final demand = 33,900 jobs

- Man years per unit = 0.34 total labor or
  = 0.19 direct labor and
  = 0.15 indirect labor

III. INDUSTRY SYSTEMS

A. Industrial Process Heat

- 5,000 sq. ft of flat plate or evacuated tube collectors, ancilliary storage, heat exchangers, piping, pumps, fittings, system controls, etc.

- Average unit cost = $20/sq. ft. or $100,000

- Average daily "oil savings" = 0.4 B/DOE

- Each unit installed requires:

  2,579 hours of direct labor
  2,382 hours of indirect labor
  4,961 hours of total labor

- Each $1 Billion total demand = 10,000 units

- Each $1 Billion total demand = 30,460 jobs

- Man years per unit = 3.04 total labor
  = 1.58 total direct labor and
  = 1.46 total indirect labor

NEW ENGLAND

I. SOLAR RELATED EMPLOYMENT OUTLOOK, DIRECT LABOR ONLY

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
Active	78	3,924	6,020	12,418	27,486
Passive	1,283	1,796	4,633	4,633	15,428
Firewood	2,850	7,750	10,250	7,714	14,150
Photovoltaics	--	782	1,330	1,849	2,839
Wind	148	326	894	1,815	2,857
Subtotal	4,359	14,578	23,127	36,246	62,760
Say	4,000	14,000	22,000	35,000	60,000
INDUSTRY SYSTEMS					
Biomass	3,163	5,457	8,340	11,017	13,256
Wind	119	812	2,593	5,682	12,896
Photovoltaics	--	330	1,698	2,939	5,407
Subtotal	3,282	6,599	12,631	19,638	31,559
Say	3,000	6,000	11,000	18,000	30,000
INDUSTRY SYSTEMS					
Industrial Process Heat	--	4,000	8,000	18,000	35,000
Subtotal	--	4,000	8,000	18,000	35,000
GRAND TOTAL	7,000	24,000	40,000	71,000	125,000
(Delta)	(-----)	(17,000)	(16,000)	(31,000)	(54,000)

Conversions of "Solar Units" to Direct Labor

BUILDINGS SYSTEMS

- Active — Previous "Units" - 5 x 0.172 = Direct Man Years
- Passive — Previous "Units" - 5 x 0.069 = " " "
- Wood — Current "Units" - (50% x 1980 Units) x 2 = Direct M. Yr.
- Photovoltaics — Previous "Units" - 5 x 0.19 = Direct Man Years
- Wind — Previous "Units" - 5 x 2.67 = " " "

ELECTRIC SYSTEMS

- Biomass — Current "Units" x 0.66 x 0.39 = Direct Man Years
- Wind — Previous "Units" - 5 x 2.67 = " " "
- Photovoltaics — Previous "Units" - 5 x 0.19 = " " "

INDUSTRIAL SYSTEMS

- Industrial Process Heat — Previous "Units" - 5 x 1.58 = Direct Man Years

NEW ENGLAND

II. SOLAR ENERGY MARKET PENETRATION GOALS
(Quantities in Thousand Barrels/Day Oil Equivalents - KB/DOE)

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
- Active	-	4.0	10.2	22.8	50.7
- Passive	1.2	2.9	7.3	14.5	29.1
- Wood	30.7	57.2	70.6	82.7	91.8
- Photovoltaics	-	0.3	2.8	6.1	10.8
- Wind	0.2	1.0	2.8	6.9	13.2
Subtotal	32.1	65.4	93.7	133.0	195.6
ELECTRIC SYSTEMS					
- Biomass	48.0	82.7	126.4	166.9	200.8
- Wind	-	1.9	7.6	20.0	48.2
- Photovoltaics	-	-	3.1	8.4	18.5
Subtotal	48.0	84.6	137.1	195.3	267.5
INDUSTRY SYSTEMS					
- Industrial Process Heat	-	3.2	13.6	36.6	80.6
Subtotal	-	3.2	13.6	36.6	80.6
GRAND TOTAL KB/DOE	80.1	153.2	244.4	364.9	543.7
(Delta)	(----)	(73.1)	(91.2)	(120.5)	(178.8)

Conversions of "Solar Units" to "Barrels/Day" Oil Equivalent.

BUILDING SYSTEMS

- Active	No. of units	x 0.035	=	B/DOE
- Passive	" " "	x 0.013	=	"
- Wood	" " "	x 10.8	=	"
- Photovoltaics	" " "	x 0.068	=	"
- Wind	" " "	x 1.17	=	"

ELECTRIC SYSTEMS

- Biomass	No. of units	x 3.9	=	B/DOE
- Wind	" " "	x 1.17	=	"
- Photovoltaics	" " "	x 0.068	=	"

INDUSTRIAL SYSTEMS

Industrial Process Heat	No. of units	x 0.4	=	B/DOE

EXHIBIT 5, PAGE 3

NEW ENGLAND

III. Unit Goals by Technology - Cumulative, except Wood and Biomass Annualized

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
- Active	915	115,000	290,000	651,000	1,450,000
- Passive	93,150	223,300	559,000	1,118,000	2,236,000
- Wood	2,850	5,300	6,550	7,650	8,500
- Photovoltaics	-	5,140	40,150	88,800	163,500
- Wind	165	775	2,450	5,850	11,200
ELECTRIC SYSTEMS					
- Biomass	12,290	21,200	32,400	42,800	51,500
- Wind	135	1,655	6,510	17,150	41,300
- Photovoltaics	-	2,170	46,850	124,200	266,500
INDUSTRY SYSTEMS					
- Industrial Process Heat	-	8,060	34,100	91,450	201,500

Short Description of "Units". See also "Description of 'Units' and Assumptions"

BUILDINGS SYSTEMS

- Active — 500 sq. ft. of flat plate or evacuated tube collectors, etc.
- Passive — 200 sq. f.t of solar space, including glazing, etc.
- Wood — 1,000 cords dry, mixed firewood
- Photovoltaics — 1,000 sq. ft. array of PV cells, storage, inverter, etc.
- Wind — 132 KW wind generator, tower, generator, etc.

ELECTRIC SYSTEMS

- Biomass — 1,000 Tons Green Chips
- Wind — 132 KW wind generator, tower, generator, etc.
- Photovoltaics — 1,000 sq. ft. array

INDUSTRY SYSTEMS

- Industrial Process Heat — 5,000 sq. ft. of flat plate or evacuated tube collectors.

CONNECTICUT

I. SOLAR RELATED EMPLOYMENT OUTLOOK, DIRECT LABOR ONLY

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
Active	19	921	1,445	2,958	6,536
Passive	326	462	1,182	1,970	3,940
Firewood	715	1,686	2,086	2,686	3,286
Photovoltaics	--	182	258	380	836
Wind	--	76	88	320	454
Subtotal	1,060	3,327	5,059	8,314	15,052
Say	1,000	3,000	5,000	8,000	15,000
ELECTRIC SYSTEMS					
Biomass	103	257	386	463	515
Wind	31	182	579	1,063	2,590
Photovoltaics	--	102	526	855	1,254
Subtotal	134	541	1,491	2,381	4,359
Say	100	500	1,400	2,250	4,000
INDUSTRY SYSTEMS					
Industrial Process Heat	--	1,250	2,500	4,500	12,000
Subtotal	--	1,250	2,500	4,500	12,000
GRAND TOTAL	1,100	4,750	8,900	14,750	31,000
(Delta)	(----)	(3,650)	(4,150)	(5,850)	(16,250)

Conversions of "Solar Units" to Direct Labor

BUILDINGS SYSTEMS

- Active — Previous "Units" - 5 x 0.172 = Direct Man Years
- Passive — Previous "Units" - 5 x 0.069 = " " "
- Wood — Current "Units" - (50% x 1980 Units) x 2 = Direct M. Yr.
- Photovoltaics — Previous "Units" - 5 x 0.19 = Direct Man Years
- Wind — Previous "Units" - 5 x 2.67 = " " "

ELECTRIC SYSTEMS

- Biomass — Current "Units" x 0.66 x 0.39 = Direct Man Years
- Wind — Previous "Units" - 5 x 2.67 = " " "
- Photovoltaics — Previous "Units" - 5 x 0.19 = " " "

INDUSTRIAL SYSTEMS

- Industrial Process Heat — Previous "Units" - 5 x 1.58 = Direct Man Years

CONNECTICUT

II. Solar Energy Market Penetration Goals
(Quantities in Thousand Barrels/Day Oil Equivalents - KB/DOE)

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
- Active	-	0.9	2.4	5.4	12.0
- Passive	0.3	0.7	1.9	3.7	7.5
- Wood	7.7	12.9	15.1	18.3	21.6
- Photovoltaics	--	0.1	0.5	1.2	2.4
- Wind	--	0.1	0.3	1.0	2.0
Subtotal	8.0	14.7	20.2	29.6	45.5
ELECTRIC SYSTEMS					
- Biomass	1.6	3.9	5.8	7.0	7.8
- Wind	--	0.4	1.7	4.0	9.5
- Photovoltaics	--	--	1.0	2.5	5.1
Subtotal	1.6	4.3	8.5	13.5	22.4
INDUSTRY SYSTEMS					
- Industrial Process Heat	-	1.0	4.0	8.1	26.0
Subtotal	-	1.0	4.0	8.1	26.0
GRAND TOTAL KB/DOE	9.6	20.0	32.7	51.2	93.9
(Delta)	(9.6)	(10.4)	(12.7)	(01.9)	(365.6)

Conversions of "Solar Units" to "Barrels/Day" Oil Equivalent.

BUILDING SYSTEMS

- Active	No. of units	x 0.035	=	B/DOE
- Passive	" " "	x 0.013	=	"
- Wood	" " "	x 10.8	=	"
- Photovoltaics	" " "	x 0.068	=	"
- Wind	" " "	x 1.17	=	"

ELECTRIC SYSTEMS

- Biomass	No. of units	x 3.9	=	B/DOE
- Wind	" " "	x 1.17	=	"
- Photovoltaics	" " "	x 0.068	=	"

INDUSTRIAL SYSTEMS

Industrial Process Heat	No. of units	x 0.4	=	B/DOE

CONNECTICUT

III. Unit Goals by Technology - Cumulative, except Wood and Biomass Annualized

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
- Active	225	27,000	69,000	155,000	345,000
- Passive	23,600	57,100	142,750	285,500	571,000
- Wood	715	1,200	1,400	1,700	2,000
- Photovoltaics	-	1,200	8,000	18,000	40,000
- Wind	-	85	250	850	1,700
ELECTRIC SYSTEMS					
- Biomass	400	1,000	1,500	1,800	2,000
- Wind	35	375	1,460	3,450	8,300
- Photovoltaics	-	670	14,500	37,000	70,000
INDUSTRY SYSTEMS					
- Industrial Process Heat	-	2,580	10,000	20,250	65,480

Short Description of "Units". See Also "Description of 'Units' and Assumptions"

BUILDINGS SYSTEMS

- Active 500 sq. ft. of flat plate or evacuated tube collectors, etc.
- Passive 200 sq. f.t of solar space, including glazing, etc.
- Wood 1,000 cords dry, mixed firewood
- Photovoltaics 1,000 sq. ft. array of PV cells, storage, inverter, etc.
- Wind 132 KW wind generator, tower, generator, etc.

ELECTRIC SYSTEMS

- Biomass 1,000 Tons Green Chips
- Wind 132 KW wind generator, tower, generator, etc.
- Photovoltaics 1,000 sq. ft. array

INDUSTRY SYSTEMS

- Industrial Process Heat 5,000 sq. ft. of flat plate or evacuated tube collectors.

MASSACHUSETTS

I. SOLAR RELATED EMPLOYMENT OUTLOOK, DIRECT LABOR ONLY

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
Active	40	1,946	2,958	6,158	13,691
Passive	607	855	2,194	3,657	7,314
Firewood	820	2,380	2,980	3,580	3,980
Photovoltaics	--	380	665	950	1,140
Wind	53	75	481	641	908
Subtotal	1,520	5,636	9,278	14,986	27,033
Say	1,500	5,500	9,000	15,000	25,000
ELECTRIC SYSTEMS					
Biomass	206	412	901	1,544	1,802
Wind	44	358	854	2,339	4,966
Photovoltaics	--	142	724	1,330	2,755
Subtotal	250	912	2,479	5,213	9,523
Say	250	900	2,400	5,000	10,000
INDUSTRIAL SYSTEMS					
Industrial Process Heat	--	1,700	3,300	7,500	12,000
Subtotal	--	1,700	3,300	7,500	12,000
GRAND TOTAL	1,750	8,100	14,700	27,500	47,000
(Delta)	(-----)	(6,350)	(6,600)	(12,800)	(19,500)

Conversions of "Solar Units" to Direct Labor

BUILDINGS

- Active — Previous "Units" - 5 x 0.172 = Direct Man Years
- Passive — Previous "Units" - 5 x 0.069 = " " "
- Wood — Current "Units" - (50% x 1980 Units) x 2 = Direct M. Yr.
- Photovoltaics — Previous "Units" - 5 x 0.19 = Direct Man Years
- Wind — Previous "Units" - 5 x 2.67 = " " "

ELECTRIC SYSTEMS

- Biomass — Current "Units" x 0.66 x 0.39 = Direct Man Years
- Wind — Previous "Units" - 5 x 2.67 = " " "
- Photovoltaics — Previous "Units" - 5 x 0.19 = " " "

INDUSTRIAL SYSTEMS

- Industrial Process Heat — Previous "Units" - 5 x 1.58 = Direct Man Years

MASSACHUSETTS

II. Solar Energy Market Penetration Goals
(Quantities in Thousand Barrels/Day Oil Equivalents - KB/DOE)

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
- Active	-	2.0	5.0	11.3	25.2
- Passive	0.6	1.4	3.4	6.9	13.9
- Wood	8.8	17.3	20.5	23.8	25.9
- Photovoltaics	-	0.2	1.4	3.1	5.1
- Wind	0.1	0.2	1.3	2.7	4.7
Subtotal	9.5	21.1	31.6	47.8	74.7
ELECTRIC SYSTEMS					
- Biomass	3.1	6.2	13.7	23.4	27.3
- Wind	-	0.9	2.7	7.8	18.7
- Photovoltaics	-	-	1.3	3.7	8.7
Subtotal	3.1	7.1	17.7	34.9	54.7
INDUSTRY SYSTEMS					
- Industrial Process Heat	-	1.0	4.4	11.7	25.8
Subtotal	-	1.0	4.4	11.7	25.8
GRAND TOTAL KB/DOE	12.6	29.2	53.7	94.4	155.2
(Delta)	(----)	(16.6)	(24.5)	(40.7)	(60.8)

Conversions of "Solar Units" to "Barrels/Day" Oil Equivalent.

BUILDING SYSTEMS

- Active	No. of units	x 0.035	=	B/DOE
- Passive	" " "	x 0.013	=	"
- Wood	" " "	x 10.8	=	"
- Photovoltaics	" " "	x 0.068	=	"
- Wind	" " "	x 1.17	=	"

ELECTRIC SYSTEMS

- Biomass	No. of units	x 3.9	=	B/DOE
- Wind	" " "	x 1.17	=	"
- Photovoltaics	" " "	x 0.068	=	"

INDUSTRY SYSTEMS

Industrial Process Heat	No. of units	x 0.4	=	B/DOE

MASSACHUSETTS

III. Unit Goals by Technology - Cumulative, except Wood and Biomass Annualized

	1980	1985	1990	1995	2000
BUILDING SYSTEMS					
- Active	430	57,000	143,000	322,000	720,000
- Passive	44,000	106,000	265,000	530,000	1,060,000
- Wood	820	1,600	1,900	2,200	2,400
- Photovoltaics	-	2,500	20,000	45,000	75,000
- Wind	60	200	1,100	2,300	4,000
ELECTRIC SYSTEMS					
- Biomass	800	1,600	3,500	6,000	7,000
- Wind	50	720	2,320	6,700	16,000
- Photovoltaics	-	940	20,000	55,000	127,500
INDUSTRY SYSTEMS					
- Industrial Process Heat	-	2,580	10,925	29,275	64,480

Short Description of "Units". See also "Description of 'Units' and Assumptions"

BUILDINGS SYSTEMS

- Active 500 sq. ft. of flat plate or evacuated tube collectors, etc.
- Passive 200 sq. f.t of solar space, including glazing, etc.
- Wood 1,000 cords dry, mixed firewood
- Photovoltaics 1,000 sq. ft. array of PV cells, storage, inverter, etc.
- Wind 132 KW wind generator, tower, generator, etc.

ELECTRIC SYSTEMS

- Biomass 1,000 Tons Green Chips
- Wind 132 KW wind generator, tower, generator, etc.
- Photovoltaics 1,000 sq. ft. array

INDUSTRY SYSTEMS

- Industrial Process Heat 5,000 sq. ft. of flat plate or evacuated tube collectors.

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APPENDIX D.—ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD BY NICHOLAS STAUB FOR THE INDUSTRIAL FABRICS ASSOCIATION INTERNATIONAL

In this article a mechanical engineer looks at solar loads and what awnings can do to reduce the heat gain. He presents some interesting evidence which indicates the utility of awnings for modern buildings with or without air-conditioning. For the Canvas Products Manufacturer who specializes in awnings, this article documents the potential of awnings in the control of solar loads.

Solar Shading With Canvas Awnings

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The trend today in building construction is toward more glass and insulating panels (curtain wall) and away from masonry load bearing walls. While both types of walls serve as separators between indoors and outdoors, there are inherent differences between the two different types of constructions. Factors affecting choice include price, esthetics, construction time, material availability, psychological effect, etc.

Building occupants still desire and demand comfort regardless of the type of separation between them and outdoors. Glass is more vulnerable to solar radiation than a massive opaque wall, and to maintain a comfortable condition in the building the solar heat must be removed from the space by mechanical means or prevented by shading from reaching the occupied space at all.

What constitutes the amount of heat transfer through windows? A window receives direct solar radiation from the sky, reflected radiation by the ground and other surfaces, diffuse sky radiation, and convected energy due to the differences in indoor and outdoor temperature. If no means is provided to prevent this energy from impinging on the glass a large portion of the direct, reflected, and diffuse solar radiation passes directly through the glass into the space, a smaller fraction is reflected back into the atmosphere and the remainder is absorbed by the glass. The solar energy absorbed by the glass itself heats the glass to higher than outside temperature and this heat is retransferred from the glass.

The amount of total heat transferred through unshaded regular plate glass, ordinary window glass, and heat absorbing glass for a clear atmosphere at 40 degrees North Latitude on August 1, is shown in Table I. These values were taken from *The American Society of Heating and Refrigeration and Air Conditioning Engineers Guide*. The values given are in British Thermal Units per square foot of glass.

Table I—Total Heat Gain Through Unshaded Glass
(Btuh/sq. ft.)

Orientation	Sun Time	Regular Plate A*	Ordinary Window B*	Heat Absorbing C*
	7 A.M.	183	199	135
E	8	192	211	142
A	9	172	187	129
S	10	124	137	94
T	11	67	71	54
	12	32	33	27
	8 A.M.	19	20	14
	9	44	48	34
S	10	73	78	57
O	11	96	104	75
U	12	107	115	84
T	1 P.M.	103	110	82
H	2	85	90	69
	3	59	63	50
	4	36	37	32
	12	32	33	27
W	1 P.M.	73	77	61
E	2	136	147	107
S	3	189	204	148
T	4	210	228	164
	5	202	217	157

* A. Regular Plate Glass Transmittance = 0.77
* B. Ordinary Window Glass Transmittance = 0.87
* C. Heat Absorbing Glass Transmittance = 0.41

If an opaque awning is used to shade a window in such a way that no direct solar radiation falls upon the glass surface, the heat transferred will be reduced to the reflected solar radiation from the ground, the diffuse sky radiation from the portion of the sky visible by the glass under the awnings and the heat due to difference in indoor and outdoor temperature.

A research project carried out by Necati Ozisik and L. F. Schutrum for the "American Society of Heating and Air Conditioning Engineers" in 1958 determined values for the heat gain through windows shaded by canvas awnings. Four different type awnings were in turn placed on the test apparatus and heat gain measurements were made by means of a solar calorimeter. The four different types of awnings tested included:

1. Conventional type, canvas, outside dark green, underside grey-green.
2. Conventional type, canvas, outside white, underside grey.
3. Venetian type, canvas, outside dark green, underside grey-green.
4. Conventional type, plastic fabric (woven from polyvinylidene chloride monofiliments), outside and inside dark green.

The glass used in combination with the awnings was ¼ inch thick regular plate glass. The test window was 44¼ inches square, and all of the test awnings covered approximately 70 per cent of the height of the window. The total heat gains thus obtained for the window and awning combinations tested are given in Table 2.

Table 2—Total Heat Gain Through Regular Plate Glass Shaded with Awnings *(Btuh/sq. ft.)

ORIENTATION	SUN TIME	OUTDOOR TEMP	Conventional Awning				Venetian Awning
			Canvas			Plastic	Canvas
			Green	Green	White	Green	Green
			Type Head Rod Clamp				
			Standard	Extended			
EAST	7 A.M.	75	28	24	19	48	25
	8	77	25	21	14	50	23
	9	80	30	26	18	53	26
	10	83	33	28	21	48	29
	11	87	36	32	26	42	32
	12	90	35	31	27	34	31
SOUTH	8 A.M.	77	16	16	10	17	18
	9	80	23	20	15	26	26
	10	83	30	27	21	37	29
	11	87	36	32	25	45	32
	12	90	40	36	29	54	37
	1 P.M.	93	43	39	32	52	39
	2	94	43	39	32	49	41
	3	95	40	36	31	42	42
	4	94	34	32	27	34	35
WEST	12	90	35	32	27	34	31
	1 P.M.	93	43	39	32	49	39
	2	94	46	41	33	60	41
	3	95	48	43	34	69	42
	4	94	44	40	32	69	41
	5	93	48	44	37	68	44

* Data from ASHVE Report No. 1645

A comparison between Table 1 and Table 2 shows the solar shading effectiveness of the awnings. An unshaded regular plate glass window facing east allows 192 Btuh/-sq. ft. to enter at 8 A.M. This same window at the same time shaded by a conventional, green canvas awning with a standard head rod clamp allows 25 Btuh/sq. ft. to enter. If the heat gain through a south window for a period 8 A.M. to 4 P.M. is totaled from Table 1, it can be seen that 622 Btuh will enter the building. The same window with a conventional type dark green canvas awning allows

Table 3—Heat Exclusion By Awnings[a,c]

Orientation of Window	Type of Glass and Awning[b]	Heat Gain Per Sq. Ft. Glass Surface, Btu/day	Heat Excluded by the Awning	
			Btu/day	Per Cent
South[c]	Regular Plate Glass Alone	622	0	0
South	Glass with Conventional Type White Canvas Awning	225	397	64
South	Glass with Conventional Type Dark Green Canvas Awning	227	345	55
South	Glass with Conventional Type Dark Green Plastic Awning	356	266	43
West[d]	Regular Plate Glass Alone	842	0	0
West	Glass with Conventional Type White Canvas Awning	195	647	77
West	Glass with Conventional Type Dark Green Canvas Awning	239	603	72
West	Glass with Conventional Type Dark Green Plastic Awning	348	494	59

[a] Data are for a window facing a dark foreground, an awning having a 70 per cent drop, and for a typical design day (August 1) at 40 degrees North Latitude.
[b] Awnings mounted with extended head rod clamps.
[c] For period from 8 a.m. to 4 p.m.
[d] For period from 12 noon to 5 p.m.
[e] Data from ASHVE Report No. 1645.

277 Btu per square foot of glass for the same period. The awning has therefore excluded a total of 345 Btu or 55% of the heat gain of the unshaded window. Table 3 shows the heat excluded by the different types of awnings for different window orientations.

To determine the economic feasibility of using solar shading, the cost and upkeep of the shading devices must be compared with the purchase and operating expense of the air conditioning equipment. A decrease in the load of course means that less mechanical equipment need be installed to maintain the desired space temperature and humidity condition. It is from this reduction in size and amount of installed air conditioning equipment and the corresponding reduction in operating expense, that a savings can be realized.

One ton of cooling equals 12,000 Btu per hour. The installation cost for one ton of cooling for the smaller sizes of central systems (25 tons) varies between $700 and $950. The installed systems, of course, must be sized to handle the peak loads on the space. Every building has a diversity factor in the summation of the individual peak air conditioning loads in that all loads do not occur simultaneously. In the morning when the east side is hot, the west rooms are relatively cool. The peak load on the walls lags behind the peak loads on the glass because of the storage effect due to wall mass. This is to say that although a square foot of east facing regular plate glass window will allow 192 btuh through at 8 A.M. (Table 1) the installed air conditioning system would be sized for from 70% to 80% of this peak load.

For every btu that the air conditioning load can be reduced the installation cost of the equipment can be reduced from between 6 and 8 cents.

Operating costs for air conditioning systems of this size run about 6% per year of the installation cost.

This same square foot of east facing window at the same time of day shaded by a green canvas awning with a standard head rod clamp will allow the entry of 25 btu (Table 2). The reduced load then due to the shading amounts to 167 btu's. The equipment saved will be approximately 75% of this value or a 125 btu reduction.

Calculating the savings in installation cost and two years operational cost, the savings in air conditioning costs can be estimated at $8.60 to $11.50 per square foot of window area.

Using the same approach for other exposures, we obtain Table 4.

Table 4—Economy of Awnings

Exposure	East	South	West
Reduction in Cooling Load (Btuh)	125	47	125
Possible Savings per sq. ft. Window Area	$ 8.40 – $11.20	$3.20 – $4.20	$ 8.40 – $11.20

A basis can thus be obtained for determining the economic feasibility of purchasing and installing awnings. If the cost of the installed awnings is less than the figures shown in Table 4, they will save the owner money. If the prices are about the same, the purchase will be a break even situation.

air conditioning research report:

Canvas Awnings Stop Up to 77% of Sun's Heat

"OVER that period of a day during which an awning prevents the direct sun from falling upon the glass, on a southern exposure, 55 to 65 per cent of the heat gain through the window is excluded by a canvas awning, and on a western exposure, the saving is 72 to 77 per cent."

This is one of many conclusions which have come as a result of research performed by the American Society of Heating and Air Conditioning Engineers on the heat protection offered by canvas awnings. ASHAE scientists, subsidized in the project by the Canvas Products Association International and the Canvas Awning Institute, Inc., have released their findings in a report entitled "Heat Gain Through Windows Shaded by Canvas Awnings." According to William C. Brooks, CPAI president, the findings open up vast new areas of sales promotion for that segment of the canvas products industry which is concerned with the sale of fabric awnings. In addition, Mr. Brooks states that for the first time architects and engineers will be in possession of facts to aid them in specifying the use of fabric sunshading products on buildings and in conjunction with air conditioning equipment.

The actual experiments, conducted at ASHAE headquarters in Cleveland, Ohio, were performed under simulated household conditions. Awnings, of a type mentioned later, were affixed to 44¼ by 44¼ inch panes of regular and heat absorbing glass. The two types of glass, in turn, were mounted in wooden housings that approximated the side of a house. A calorimeter was used to measure the various heat gains, and other scientific instruments were present to measure wind, temperature and solar radiation.

Awnings used in this experiment were of solid colors, some equipped with standard head rod clamps and others with ¾-inch extension head rod clamps to observe the effect of venting at the top of the awning. The awnings used were of the following style, color and fabric:

1. Conventional type, canvas, outside dark green, underside grey-green.
2. Conventional type, canvas, outside white, underside grey.
3. Venetian type, canvas, outside dark green, underside grey-green.
4. Conventional type, plastic monofilament fabric, outside and underside dark green (woven).

The glass used in the experiments was a quarter of an inch thick. Some experiments were conducted with regular plate glass and others with heat absorbent glass.

To understand the tenor of this research, it is necessary to understand how heat is transferred through a window. A window receives direct solar radiation from the sun, diffuse or scattered solar radiation from the sky, reflected solar radiation from surrounding objects such as sidewalks and the ground, and low-temperature radiation, both from the sky and the surroundings. If there is no shade of any kind on the window to prevent the sun's direct rays from falling upon the glass, a large fraction of direct, diffuse and reflected solar radiation passes directly through the glass into the room, a smaller fraction is reflected by the window, back into the atmosphere, and the remainder is absorbed by the glass. The fraction of solar radiation, regardless if it's direct, diffuse or reflected, which passes directly through the glass, is a heat gain component called "transmitted solar energy."

Punched for easy reference and ready reference in CPAI manual

Design data on heat gain through awning-glass combinations for 75F indoor temperature. Figures contained in this table are the data which air conditioning engineers will actually use to determine heat gain in Btu's per hour through any particular window at any outdoor temperature and ultimately to indicate the reduction in heat gain which a particular type of awning can be expected to achieve.

Table 2—Design data on heat gain[a] through awning-glass combinations for 75F indoor temp.

Orientation	Sun Time	Outdoor Temp., F.	Table - 2A Transmitted			Table - 2B Heat Gains With Awnings Convection—Radiation					Table - 2C Total Gain					Table - 2D Total Heat Gain Glass Only		
			Awning Type Used													Type Glass		
			Conventional		Venetian	Conventional				Venetian	Conventional				Venetian	Reg.	Ord.	Heat
			Canvas	Plastic	Canvas	Canvas			Plastic	Canvas	Canvas			Plastic	Canvas	Plate	Window	Absorb.
						Green	Green	White	Green	Green	Green	Green	White	Green	Green	(b)	(c)	(d)
						Type Head Rod Clamp					Type Head Rod Clamp							
						Standard	Extended				Standard	Extended						
EAST	7AM	75	6+9*	31+9*	9+8*	13	9	4	8	8	28	24	19	48	25	183	199	135
	8	77	8	38	11	17	13	6	12	12	25	21	14	50	23	192	211	142
	9	80	9	37	11	21	17	9	16	15	30	26	18	53	26	172	187	129
	10	83	9	30	12	24	19	12	18	17	33	28	21	48	29	124	137	94
	11	87	10	22	12	26	22	16	20	20	36	32	26	42	32	67	71	54
	12	90	9	13	10	26	22	18	21	21	35	31	27	34	31	52	53	27
SOUTH	6AM	77	6	10	7+4*	10	10	4	7	7	16	16	10	17	18	19	20	14
	9	80	7	16	9+6*	16	15	8	10	11	25	20	15	26	25	44	48	34
	10	83	9	21	11+2*	21	18	12	16	16	30	27	21	37	29	75	78	57
	11	87	9	24	11	27	23	16	21	21	36	32	25	45	32	96	104	75
	12	90	10	29	12	30	26	19	25	25	40	36	29	54	37	107	115	84
	1PM	93	9	24	11	34	30	23	28	28	43	39	32	52	39	103	110	82
	2	94	9	21	11+2*	34	30	23	28	28	43	39	32	49	41	85	90	69
	3	93	7	16	9+6*	33	29	24	26	27	40	36	31	42	42	59	63	50
	4	94	6	10	7+4*	28	26	21	24	24	34	32	27	34	35	36	37	32
WEST	12	90	9	13	10	26	23	18	21	21	35	32	27	34	31	52	53	27
	1PM	93	10	22	12	33	29	22	27	27	45	39	32	49	39	74	77	61
	2	94	9	30	12	37	32	24	30	29	46	41	33	60	41	136	147	107
	3	93	9	37	11	39	34	25	32	31	48	43	34	69	42	189	204	148
	4	94	8	38	11	36	32	24	31	30	44	40	32	69	41	210	228	164
	5	93	6+9*	31+9*	9+8*	33	29	22	28	27	48	44	37	68	44	202	217	157

NOTE: Data obtained from a 44 in. square regular plate glass window facing a dark foreground and shaded by an awning having a drop of 70 percent.
Values calculated for a combined outside conductance of 3 Btu per (hr) (sq ft) (F).

[a] All heat gains are in Btu per (hr) (sq ft).

[b] Regular plate glass, with transmittance for direct solar radiation (normal) 0.77.

[c] Ordinary window glass, with transmittance for direct solar radiation (normal) 0.87.

[d] Heat absorbing glass, with transmittance for direct solar radiation (normal) 0.41.

[e] Addition due to direct sun on the glass.

The solar radiation that is absorbed by the glass causes an increase in the temperature of the glass until an equilibrium is reached between the amount of heat the glass absorbs and the amount that it dissipates. When this equilibrium is reached, the glass temperature remains constant and additional solar heat which touches the glass is partly passed out into the atmosphere and partly passed into the house. The heat that is passed into the room is called, "convection-radiation heat gain."

Transmitted solar energy heat gain and convection-radiation heat gain are the two terms which explain how heat enters a room through unprotected windows.

Knowing the amount of heat transmitted through an unprotected window, researchers accumulated and tabulated the amount of heat that entered a window equipped with the aforementioned fabric awnings. They found that in the presence of an awning which is opaque or non-transparent to solar radiation . . . if no direct rays fall upon the glass surface, the ground reflected radiation entering through side and bottom openings of the awning, and the diffuse sky radiation coming from that portion of the sky "visible" by the glass under the awning, form the major portion of the transmitted heat gain that passes directly through the glass.

They also found that if the awning has a high surface temperature, it tends to increase the temperature of the glass, both by radiation and by warming the air under the awning. Therefore, in the presence of the awning, the glass temperature is determined by the temperature of the awning and the temperature of air under the awning. If the temperature of the awning and the air under it is high, the temperature of the glass will be high and the amount of heat transmitted by convection-radiation into the room will be greater.

With this knowledge, the researchers tried awnings of different colors to find the one that absorbed the least heat. They found that the awning with the white outer surface was least heat absorbent and, therefore, white or light colored awnings are more effective in reducing the temperature on the inside of a room.

Another interesting finding of the researchers was that the conventional type of awning with ends was more effective at lowering room temperature than the venetian type without ends. Test supervisors concluded that this difference was due to the fact that more reflected solar radiation and diffused solar radiation entered the open ends of the venetian type awning, thereby increasing the temperature of the glass.

It was further determined that an awning having a low solar absorbing surface on the outside (white) will remain about the same as the outdoor air temperature. Thus, air under the awning is not appreciably heated and venting of such an awning is not important . . . contrary to much previous industry thought. The importance of venting an awning increases minutely with the degree to which the awning absorbs heat. For instance, it is more important to vent a dark-colored awning than a light one, but the difference venting makes in the temperature of the glass does not make it a vital factor. For wind velocities above 5 to 6 mph, venting of the awning is even less important, since the wind carries away the trapped warm air under the awning.

Experiments showed that a light foreground in the presence of direct sunlight may approximately double the transmitted heat gain for a canvas awning-glass combination. This is due to the fact that a light foreground reflects heat directly into the window. For a plastic awning, the increase is approximately equal to that of a canvas awning.

The use of heat absorbing glass instead of regular plate glass in combination with awnings causes only a slight reduction in the total heat gain, provided the sunlit portion of the glass is not large.

The plastic woven monofilament awning proved somewhat less effective in reducing heat transfer because its more loosely woven nature allowed a fraction of the solar radiation to pass through it onto the surface of the window.

Heat exclusion by awnings. How many Btu's per day of heat awnings on south and west facing windows can be expected to exclude are the data recorded in this table.

Table 4 — Heat exclusion by awnings[a]

Orientation of Window	Type of Glass and Awning[b]	Heat gain per 100 sq ft glass surface, Btu/Day	Heat Excluded by the Awning	
			Btu/Day	Percent
South[c]	Regular plate glass alone	62200	0	0
South	Glass with conventional type white canvas awning	22500	39700	64
South	Glass with conventional type green canvas awning	27700	34500	55
South	Glass with conventional type dark green plastic awning	35600	26600	43
West[d]	Regular plate glass alone	84200	0	0
West	Glass with conventional type white canvas awning	19500	64700	77
West	Glass with conventional type green canvas awning	23900	60300	72
West	Glass with conventional type dark green plastic awning	34800	49400	59

[a]Data are for a window facing a dark foreground, an awning having a 70 percent drop, and for a typical design day (Aug. 1) at 40 deg. North Latitude.
[b]Awnings mounted with extended-head-rod clamps.
[c]For period from 8 a.m. to 4 p.m.
[d]For period from 12 noon to 9p.m.

CANVAS PRODUCTS FABRICATORS . . . PLEASE NOTE

From the point of view of the canvas products industry, the most important finding of the research program conducted in Cleveland is that a fabric awning very substantially reduces the heat gain through a window. Just how much is rather startling. For example on a southern exposure, 55 to 65 per cent of the heat gain through the window is excluded by a fabric awning, and on a western exposure the awning effectively blocks out 72 to 77 per cent of the solar energy components represented by the term heat gain.

As a result, not only do we know (as we always have) that fabric awnings make a house cooler, we know almost exactly how much heat they will control, under specific conditions. What's more, we have positive proof that awnings and air conditioning equipment are as inseparable as shoes and socks. As a matter of fact, we now can prove to engineers and architects that they ought to use sunshading in connection with residential and commercial air conditioning equipment to avoid wasting a client's money.

Just as important is the fact that we also have a means for selling fabric awnings to Mrs. Housewife later in the season at a time when the awning business is thought to be over.

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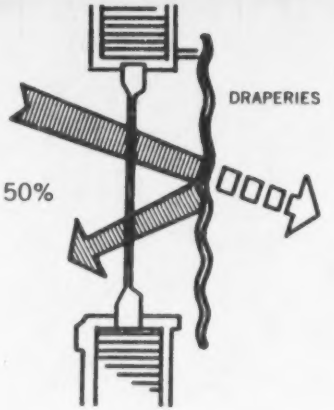
Prepared by the CPAI Public Relation and Promotional Department

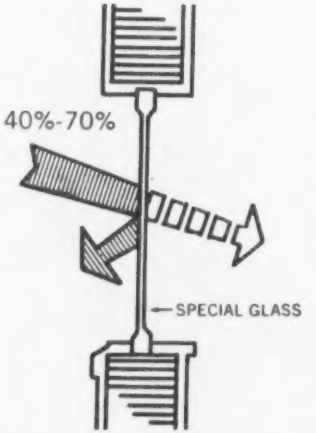
Shade Windows, Especially from Direct Sun

The daytime heat gain through windows, which typically comprise 15 to 30% of the exterior wall area of a house, puts a heavy load on air-conditioning equipment. Windows having ordinary glass transmit most of the radiant solar energy to which they are subjected and much of the heat from warmer outdoor air.

All windows, especially those exposed to the sun, should be shaded by one or more of the following means (percentage reductions in heat gain are compared with untreated ordinary glass windows):

- Blinds, draperies, etc.—Such devices can reduce heat gain through windows by as much as 50%. Their effectiveness depends on how well they reflect solar radiation back through the window. They should be light in color and opaque. And they should be drawn when sunlight enters your rooms—particularly in rooms not being used for the moment.
- Special glasses—Heat-absorbing and reflecting glasses can reduce solar heat through windows by 40 to 70%. These glasses have the advantage of doing the job while not interfering appreciably with the view.
- Awnings, overhangs, etc.—By far the most effective way to reduce solar heat gain is through the use of external shading devices such as awnings, overhangs, side fins, louvered sun screens and—yes—trees. These can reduce solar heat gain by as much as 80% if properly designed. A word of caution: awnings and overhangs should be designed so as not to trap hot air in the window area.

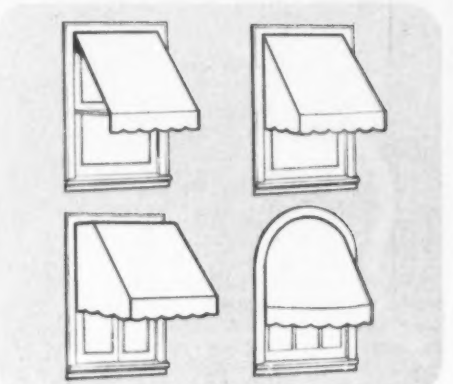




The costs of these means of coping with heat gain vary, and your decision to adopt certain improvements would probably depend on an array of factors going beyond considerations of thermal comfort alone. You might, for example, decide to plant a tree not only for increased thermal comfort but to attract songbirds and to view its spring blossoms, autumn foliage and winter tracery.

Keep storm windows in place during the air-conditioning season on all windows except those to be used for ventilating. Storm windows—and insulating glass windows as well—may not stop the penetration of solar radiation but they form significant barriers to the transfer of outdoor air heat to the indoors.

Awnings by:



Keep Your Cool This Summer.

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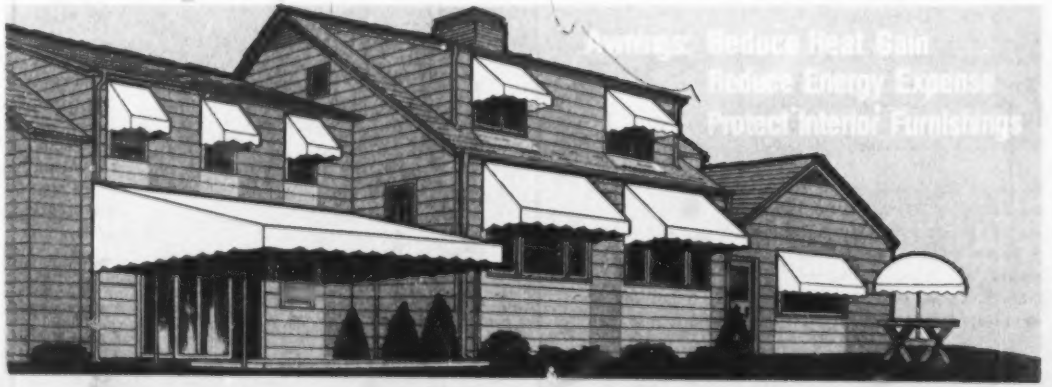
Keep Your Cool This Summer...



If you want to keep your cool this summer, try decorative fabric awnings.

Awnings can keep your home cooler. They can also reduce your air conditioning expenses. And if you're installing or replacing air conditioning equipment, awnings will allow you to reduce the size of equipment needed to effectively cool your home.

Here's how awnings do all this: Windows get to be hot spots during warm weather. Heat pours into a home through windows in three ways: Direct sunlight streams through windows and raises interior temperatures quickly. Indirect sunlight -- reflected from the ground, sidewalks and other buildings -- compounds the effects of direct sunlight. And as the direct and indirect sunlight pass through the window, the temperature of the glass rises and radiates additional heat into the house.

Shading those windows with decorative fabric awnings is one of the most effective ways of reducing solar heat gain during the hot months. Awnings block most of the direct sunlight. They greatly reduce the amount of indirect sunlight that enters a window. And they keep the window cooler, which reduces the heat radiated from the glass.

Studies conducted by the American Society of Heating and Air Conditioning Engineers a few years ago confirm this. The studies found that fabric awnings reduce heat gain by 55 to 65 percent on a southern exposure and by 72 to 77 percent on a western exposure.

Savings on operating of air conditioning will pay for the awnings in a short time. How soon depends on your windows, their number, type, the amount of wall space they cover and the direction they face. Added comfort and savings from awnings also depend on where you live and how much your air conditioner costs to run.

No two homes are exactly alike. No savings figures will be the same from one home to the next.

But with decorative fabric awnings to shade your home's windows, your home will be cooler. Your air conditioning expenses will be less. If you are adding or replacing air conditioning, your initial expense can be less.

Keep your cool this hot season.

Direct Sunlight

Sunlight through your windows raises inside temperatures quickly. Awnings reflect direct sunlight and keep your home cooler.

Indirect Sunlight

Indirect sunlight raises inside temperatures, too. Awnings also reflect most indirect sunlight.

Radiant Heat

Glass heats up quickly in full sunlight and increases inside temperatures. Awnings shade the glass and reduce the heat gain in your home.

APPENDIX E.—STATEMENT OF NATIONAL HOME IMPROVEMENT COUNCIL, INC.

NHIC

■ 11 East 44th Street, New York, N.Y. 10017 ■ (212) 867-0121 ■ National Home Improvement Council

STATEMENT OF

NATIONAL HOME IMPROVEMENT COUNCIL, INC.

BEFORE THE SUB COMMITTEE ON ENERGY, ENVIRONMENT AND SAFETY ISSUES

OF THE

COMMITTEE ON SMALL BUSINESS

UNITED STATES HOUSE OF REPRESENTATIVES

IN CONNECTION WITH HEARINGS ON

SMALL BUSINESS AND ENERGY CONSERVATION TAX CREDITS

OCTOBER 19, 1981

SALEM, MASS.

This is a statement of National Home Improvement Council on the energy tax credit as it relates to the small business community.

The National Home Improvement Council is a trade association serving the home improvement and remodeling industry, with headquarters at 11 East 44th Street., New York, N. Y. 10017. Membership is approximately 3500: the bulk of that membership is found in more than 50 chapters across the United States, and includes approximately 70 National Members. The champter membership is primarily made up of contractors.

This organization is most appreciative of the invitation to participate in this hearing. The interest of the sub committee chairman in ascertaining the views of this organization in a vital area of industry concern represents a high watermark of cooperation between government and private sector. Our very real appreciation to the Honorable Berkley Bedell, Sub Committee Chairman, for his personal interst as well as that of Mark H. Rosenberg, the Sub Committee Staff Director for his patient follow-up.

I

This organization convened meetings of industry leaders from the contractor community on both coasts in order to be able to respond to the inquiry from the sub committee staff as to the importance of the energy conservation tax credit to this small business community.

Meetings were held in Monterey, Ca. on October 17th and 18th and in Boston on October 23rd of contractor representatives from both sections of the United States. The meetings were held in two localities to afford the broadest possible expression of views.

The overwhelming consensus was that repeal of the energy tax credit for residential energy conservation installation at this time, would be most unfortunate.

Contractors were of the view that the amount of tax credit, a maximum of $300, has not in itself been the predominent factor in encouraging the American home owner towards taking the necessary energy saving steps. All do agree that the existence of the credit underlines the importance to Amerca of a firm and definite policy towards reduction of our reliance on foreign energy imports.

Considerable sentiment was expressed that possibly a larger residential tax credit might be a greater incentive towards home owner involvement. Extremely low construction industry activity and unusually high interest have slowed down activity in this industry; a larger tax incentive might help.

In any event, however, the sentiment in both meetings was overwhelmingly against dropping the energy tax credit at this time. It would be a wrong signal to both American and to the OPEC oil countries.

II

In terms of the impact on business - the general feeling within the community seems to be that the energy tax credit "is the only game in town". It is the one positive statement of the national government that urges the home owner to take affirmative action. While the impact in any specific instance is not of itself large in absolute dollar terms, its existence serves as a constant reminder to the home owner that some steps should be taken now.

Those members of the contractor community who who are active in solar installation work report that a tax credit of up to $4,000 does have a positive impact on the home owner in bringing about added business. The combination of federal and state solar tax credits are a powerful dollar incentive. In many instances a home owner can get back the major portion of the installation in tax credits. This factor has been very important in encouraging this kind of installation. Retention of the solar tax credit was very strongly urged as a real assist to the small business community.

III

The contractors present at both meetings were openly enthusiastic about congressional efforts to extend the tax credit to business and industrial areas. Most of the small business contractors associated with this organization performed work for the business community in some form.

They were strongly supportive of the concept of extending energy tax credit to the business sector. Many small businesses throughout the United States have found very difficult times in the recent past. Their buildings and facilities in many instances are old and antiquated. Extension of the tax credit might well serve the double barreled purpose of bringing conservation efforts to a needed area and to stimulate activity in the small business remodelling community.

Support was heavy for extending to the House some form of legislation as that proposed by Senator Wallop extending until 1986 the 10% energy tax credit for industry and by Senator Durenberger which would extend similar legislation to the commercial sector.

This community would look with considerable favor upon activity from the House were it to support the same kind of activity as on the Senate side.

IV

In summary:

1. Repeal of the residential energy tax credit would be most unfortunate as against the national interest: a wrong signal at the wrong time.

2. The tax credit does serve as an incentive for small business activity. Residential tax credit provides some modest incentive for new business; the solar tax credit is of such significant size as to be a major factor in generating small business activity.

3. Extension of the energy tax credit to the industrial and commercial sectors would be a beneficial step forward. Energy conservation would be increased and small business activity in the construction industry would be stimulated at the same time.

The National Home Improvement Council thanks the sub committee for this opportunity to express its views on these subjects of vital interest to this industry.

Randolph J. Siefert
Vice President & General Manager

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